

92
671 YAPEN
674

THE CONDOR

A Magazine of Western
Ornithology



Volume 46

March-April, 1944

Number 2



COOPER ORNITHOLOGICAL CLUB

THE CONDOR

A Magazine of Western Ornithology

Published Bi-monthly by the Cooper Ornithological Club

Entered as second-class matter May 15, 1925, at the post office at Berkeley, California,
under Act of Congress of February 28, 1925, Section 412, paragraph 4.

Issued from the Office of THE CONDOR, Museum of Vertebrate Zoology, Berkeley, California.

SUBSCRIPTION RATES

Three Dollars per Year in the United States, payable in advance.

Fifty Cents the single copy.

Three Dollars and Twenty-five Cents per Year in all other countries in the International Postal Union.

COOPER ORNITHOLOGICAL CLUB

Dues are payable in advance on January first for the calendar year: Three Dollars per year for members residing in the United States; Three Dollars and Twenty-five Cents in all other countries. Members whose dues are paid receive THE CONDOR without additional charge.

The Life Membership fee is Seventy-five Dollars. No additional dues are required, and the money is invested and the interest only is used for Club publications. Life Members receive The Condor without additional charge.

Send manuscripts for publication to the Editor, ALDEN H. MILLER, Museum of Vertebrate Zoology, Berkeley, California, or to the Associate Editor, JEAN M. LINSDALE, or the Assistant Editors, HARVEY I. FISHER and FRANK A. PITELKA, same address.

Send dues and subscriptions to JOHN McE. ROBERTSON, Associate Business Manager, Buena Park, California; orders for back numbers of THE CONDOR and the PACIFIC COAST AVIFAUNA series to W. LEE CHAMBERS, Business Manager, Robinson Road, Topanga, California.

Issued March 22, 1944

CONTENTS

	PAGE
Discovery of a New Vireo of the Genus <i>Neochlos</i> in Southwestern Mexico.....	Alden H. Miller and Milton S. Ray 41
The Reproductive Cycle of the Male Red-winged Blackbird.....	Philip L. Wright and Margaret H. Wright 46
The Life and Writings of James Moffitt.....	Hilda W. Grinnell 60
Check-list of the Birds of Utah.....	William H. Behle 67
FROM FIELD AND STUDY	
Methods of Grasping and Carrying Prey.....	Clarence A. Sooter 88
Aerial Insect Feeding by the California Gull.....	Walter W. Dalquest 88
Notes on Some Birds Taken in Utah.....	Arthur C. Twomey 89
California Cuckoo Collected in Eastern Oregon.....	Charles W. Quaintance 89
A Coastal Record of the Emperor Goose in California.....	Robert T. Orr 90
Observations of California Pine Grosbeak at Southern Limit of Range.....	William A. Dill 90
Shower-bathing in the Rain.....	William T. Shaw 90
A Correction of Identification of Sandpipers.....	Arthur C. Twomey 90
NOTES AND NEWS.....	91
MINUTES OF COOPER CLUB MEETINGS.....	91



NEOCHLOE BREVIPENNIS BROWNI, NEW SUBSPECIES

THE CONDOR

VOLUME 46

MARCH-APRIL, 1944

NUMBER 2

DISCOVERY OF A NEW VIREO OF THE GENUS NEOCHLOE IN SOUTHWESTERN MEXICO

By ALDEN H. MILLER and MILTON S. RAY

On October 8, 1856, a strange vireo of striking and unusual color pattern was taken by Señor Matteo Botteri at Orizaba, Vera Cruz, Mexico. Although the Vireonidae as a family consists of rather uniformly plain or dull-colored birds, here was a new member of the group, brilliant enough in plumage to rival many of the warblers. In the year following Botteri's discovery, Sclater (Proc. Zool. Soc. London, 1857:213) described this peculiar bird from southeastern Mexico as *Neochloe brevipennis*, the sole representative of a new genus.

Sumicrast (Mus. Boston Soc. Nat. Hist., 1, 1869:547), referring to this species, remarks that in the course of many years Botteri was able to procure but very few specimens. Other than the type, the only specimen taken by Botteri that has been reported is the one in the United States National Museum. In his general description of *Neochloe*, Ridgway (Birds, N. M. Amer., pt. 3, 1904:212) provided the rather indistinctive vernacular name of Green-winged Vireo for this species. Alexander Wetmore (letter of April 22, 1943) writes us as follows: "Our single specimen of *Neochloe brevipennis*, No. 38163, has no date on the label. It was catalogued here in 1865 which is the only information that we have about it. We have never received another specimen since, neither has the U. S. Fish and Wildlife Service." From Ridgway's text (*loc. cit.*) it is apparent that the sex of this particular bird is not specified.

A third specimen taken by Don R. Montes de Oca, a well known naturalist of Jalapa, Vera Cruz, Mexico, was obtained by him at that locality and formed part of a series of bird skins sent to Salvin and Godman. They described and figured this bird in their Biologia Centrali-Americana (Aves, 1, 1881:205; plate 13, fig. 2). In this plate, however, the iris is, without doubt, erroneously colored dark brown, as all later specimens have had the peculiar white eyes which are such a striking characteristic of the species. Likewise the artist has pictured a bird far too plump in form. Salvin and Godman consider this Vireo one of the rarest of all Mexican birds and add that "nothing whatever is recorded of its habits."

In the course of field work at Jalapa in the spring of 1897, Frank M. Chapman encountered this vireo in the temperate zone at 4400 feet altitude in an area of broken forests, brush patches and fields. The locality is one with a never failing supply of rain and fog. He wrote the following account (Bull. Amer. Mus. Nat. Hist., 10, 1898:26): "Three males of this rare Vireo were taken in scrubby undergrowth, two at the border of the woods and one in the more bushy growth of an old field. Their song is short, and in character is sufficiently like the notes of *Vireo noveboracensis* to enable one to recognize the singer as a Vireo before seeing it. The iris is white." Chapman's three specimens thus brought the reported take of this species to six, the total for the 84-year period between 1856 and 1940 so far as we know, and his account is the only commentary on the habitat and actions of these birds.

To the veteran field ornithologist Wilmot W. Brown goes credit for the discovery of a second member of the genus *Neochloe*, near Chilpancingo, Guerrero, Mexico, in an area far removed from the two localities in Vera Cruz where all the hitherto known specimens of this genus have been taken. After many years of field work in the country about Chilpancingo and elsewhere in Mexico, Brown on June 21, 1940, took a male *Neochloe* which he at once realized was a bird of much significance and rarity.

He tells of his experiences as follows (letters of May 5 and August 20, 1943): "My specimen was taken at 4000 feet altitude in the mountains near Chilpancingo, Guerrero, Mexico. The locality was a very remote part of a wild, deep canyon where hunter's feet have seldom trod, for this region has the reputation of being extremely rough and precipitous. The bird was collected on the steep slope of the canyon from the top of a tall tree standing among surrounding scattered pines. In foliage the tree had leaves and tiny blossoms scarcely different from the tree you have in California called the Rum or Choke Cherry. It happened at the particular time that I was ensconced in a niche in the canyon-wall watching the opposite side for a possible *Amaurospizopsis relictus*, when two small birds, similar in color, form, size and flight, flew by. Flying closely together they lit simultaneously on the tree-top. Presumably they had been down to the river in the valley, far below, to drink, and returning, had perched to rest prior to continuing their journey up the canyon. Peculiarly there was no water in the higher mountains on this particular date although it was during what is known here as the rainy season. On alighting, both birds had disappeared in the foliage at the top of the tree, which was well up on the other side of the canyon. But presently one of them emerged so that it was silhouetted against the sky. It appeared out of gun-range but I decided to try; so putting in a three inch shell I fired and to my astonishment the bird fell. As the locality where the tree grew was very steep, I was a long time reaching it, being obliged first to find a place that I could successfully climb. On arriving at the foot of the tree I saw my bird lying at the bottom of a drop-off, ten feet below, in a shady spot on a bed of leaves. On reaching this ledge, as I stooped to pick the bird up, I thought 'it's a *Basileuterus*,' but when I opened my hand and saw the strange white eyes and the peculiar coloring of the underparts I realized at once that I had taken a bird that was new to me."

When the specimen was forwarded to Ray with other collections being made for him by Brown in Guerrero, it received special study and now has been compared directly with two of Chapman's specimens, kindly loaned to us from the American Museum of Natural History by Dr. John T. Zimmer. The differences in contrast with the birds of Vera Cruz are several and are so pronounced that even though but a single western specimen is extant it prognosticates existence of a western geographic race which we take pleasure in naming in honor of Mr. Brown. It may therefore be known as the Brown *Neochloe*.

Neochloe brevipennis browni, new subspecies

Type.—No. 3333, Ray Coll., Pac. Mus. Ornith.; male in somewhat worn plumage, taken near Chilpancingo, at an elevation of about 4000 feet, Guerrero, Mexico, June 21, 1940, by Wilmot W. Brown; iris white, bill black, tarsus dusky.

Diagnosis.—Differs from *Neochloe brevipennis brevipennis* of Vera Cruz in shallower and slenderer, yet much longer, bill; culmen less sharply curved; clear olive green extends far up lower back and continues on to lateral scapular area instead of being limited to upper tail coverts and to a diluted wash on tips of a few back feathers; gray of dorsum and especially that of breast paler, deep neutral gray instead of dark neutral gray; white of belly apparently somewhat more extensive laterally.

Range.—Known only from the type locality. Presumably occupies an area in the temperate zone of southwestern Mexico.

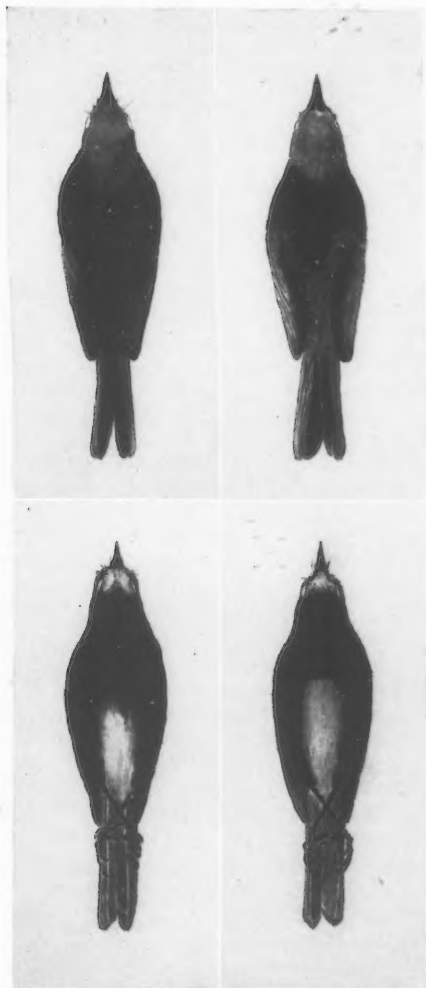


Fig. 7. Left, *Neochloe brevipennis brevipennis*; right, *Neochloe brevipennis browni*; dorsal and ventral views, $\times \frac{1}{2}$; greens of dorsal surface shown as gray. Drawings by Elizabeth Whitfield.

Measurements in millimeters.

	Wing	Tail	Culmen from base	Bill from edge of nostril	Bill depth, maximum	Bill width at nostril	Tarsus	Middle toe	Hind toe
Type, <i>N. b. browni</i> , Ray Coll., P.M.O. 3333	57.8	56.0	11.2	7.0	3.3	3.1	19.8	7.5	6.6
<i>N. b. brevipennis</i> , A.M.N.H. 153304	57.8	56.0	10.5	6.5	3.6	3.3	19.6	7.3	6.9
<i>N. b. brevipennis</i> , A.M.N.H. 153303	56.5	52.5	10.2	6.6	3.5	3.4	19.5	7.2	6.6

Dimensions of other specimens as reported in the publications cited, wherever they are comparable or can be converted into the metric system, bear out the picture derived from these three sets of dimensions. There is no indication of significant differences in measurements of wing, tail, and foot. However, the differences in bill are borne out. Ridgway reports an exposed culmen of 9 for both no. 38163 U. S. Nat. Mus. (sex?) and no. 68582 Amer. Mus. Nat. Hist. The comparable measurement of *browni* is 10.8, and for the two *N. b. brevipennis* at hand, 9.7 and 9.8. Salvin and Godman's measurement of the de Oca specimen (sex?), from tip of bill to rictus is about 14.0 mm.; U. S. Nat. Mus. no. 38163 is 14.2 (Baird, Rev. Amer. Birds, 1866:372); *N. b. brevipennis* at hand, 14.6, 14.9; *browni* 15.5. Furthermore the Salvin and Godman plate shows a short heavy bill in the de Oca specimen like the Vera Cruz birds we have examined.

Question has entered our minds, as it may well those of others, about the characteristics of plumage of *browni*. Their departure from those of *N. b. brevipennis* can scarcely be regarded as seasonal variation, since comparisons have been made between males taken in spring. But, may not the specimen of *browni* display a first-year plumage heretofore unknown in the species?

First-year plumages are differentiated little or not at all from those of adults in the Vireonidae so that we might not suspect such a condition in *Neochloe* which could account for the coloration of *browni*. On the other hand *Neochloe* is a distinctly aberrant vireo with respect to color pattern and may not correspond to its relatives in plumage sequence. The coloration of *browni* is what one might expect in the uplands of Guerrero, an area certainly less continually humid than the habitat of *N. b. brevipennis* in Vera Cruz. There is thus a strong presumption favoring the idea that the coloration of the type of *browni* represents a racial character, an adjustment to environmental conditions, and not a heretofore unknown age variation. Nonetheless this problem remains to be settled. Were it not for the very positive differences in bill size and shape which accompany the striking plumage differentiation, we would still have hesitated to describe this form based on a single specimen. (Morphologically *browni* is as distinctive as some full species and in an earlier period of taxonomy would probably have been described as such.) Over 40 years have elapsed between the taking of Chapman's and Brown's specimens of *Neochloe*. We are likely, therefore, to have only a limited knowledge of this genus for some time to come. Progress should be reported without undue delay. Brown's specimen indicates two new things: (1) an important extension of geographic range for the species and (2) geographic variation within it, even though all the details of this variation are not yet fully known. It may be pointed out that the females of both forms remain undescribed.

Well acquainted with Mexico through long residence, Brown thus contrasts the habitats of the two forms of *Neochloe* (letter of July 18, 1943): "Chilpancingo is not only a long distance from Jalapa, where most of the examples of *Neochloe* have been collected, but (and much more important) the climate and character of the surrounding country are so entirely different. Chilpancingo is in open country with corn fields and cattle ranches and has a dry (except during the rainy season), semi-cool and very windy climate. The foothills are covered with brush and a scrub-growth of trees, while farther back rise the mighty Sierra Madre del Sur with their dark belt of pines silhouetted against the sky.

"Jalapa, on the other hand, has a warm, humid climate, for when the moist-laden clouds from the Gulf impinge on the mountain tops above they condense under the influence of the cool air and precipitate on the town below. In the region about Jalapa are coffee, tobacco and banana plantations and in the forests orchids are to be seen on the trees and these with graceful tree-ferns, and flowers in great profusion, add huge blotches of color to the landscape. The mountain slopes are well forested and the

ravines, particularly, are choked with luxuriant tropical vegetation, making collecting, at times, exceedingly difficult."

Referring to the climate of the Chilpancingo area, Brown explains that this is divided into the two seasons, wet and dry. In his letter of May 28, 1943, he writes: "The rains are now beginning; there is water in the river bed which looks strange as it has been dry for so many months." On June 27, 1943, he says: "It is now the rainy season here; the mountains look very beautiful, the trees are heavy with foliage and everything is fresh and velvety green and wild flowers of many varieties and colors are growing in profusion along the mountain trails. The river is a rushing torrent; too noisy to collect near. Last season, at one place, it rose above some of the tree-tops as debris deposited on the higher branches well attested long afterward."

From these and other excerpts from his letters it will be seen that the rainy season extends from June to November. Brown's notes also show that the taking of the lone specimen of *Neochloe brevifemmis browni* was dependent on three fortunate factors: favorable weather conditions during the rainy season, continual combing of a wide area of precipitous mountain-sides by a tireless and long-experienced field ornithologist, and lastly extremely good marksmanship on the part of Mr. Brown himself.

Museum of Vertebrate Zoology, Berkeley, and Pacific Museum of Ornithology, San Francisco, California, January 7, 1944.

THE REPRODUCTIVE CYCLE OF THE MALE RED-WINGED BLACKBIRD

By PHILIP L. WRIGHT and MARGARET H. WRIGHT

Most North American passerine birds come into adult plumage in their first year of life so that yearling and older birds are indistinguishable during the breeding season. In several species, among them the Red-winged Blackbird (*Agelaius phoeniceus*), the adult male plumage is not acquired until after the breeding season in the second year, when the birds are 13 to 15 months of age. McIlhenny (1940) states that the year-old male Red-wings in Louisiana do not breed. Most authors, if they mention the plumage of the yearling male at all, designate it as an immature plumage (Bailey, 1917; Chapman, 1934; Peterson, 1939 and 1941), although at least two (Dwight, 1900; Forbush, 1927) call it the first nuptial plumage. In his extensive study of the ecology of the Eastern Red-wing (*Agelaius p. phoeniceus*), Allen (1914) briefly describes the gross changes in the testes of Red-wings taken in the spring months. His collections apparently were not extensive, and he makes no statement concerning the final state of the testes of the yearling males, which he calls "immature." He does state, however (p. 95), that "the resident immature males" migrate later in the spring and breed later than do the adults. Smith (1943) states that in the region of Chicago "males with duller brownish feather tips on the body and the wing coverts" establish territories though they do so later than the adult males. There seems to be no doubt but that the yearling females of *Agelaius phoeniceus* breed. In the closely related Tri-colored Red-wing (*Agelaius tricolor*), Lack and Emlen (1939) report that the males with the dull epaulets (year-olds?) usually are not restricted to territories, yet these birds showed some evidence of mating behavior. They chased females, and one copulated with a taxidermic mount of a female.

The present investigation has been made to determine what differences exist between the testis cycles of the adult and yearling Red-wings and to obtain additional data on the status of the yearlings as breeders.

MATERIALS

Red-wings are abundant breeders in the irrigated Flathead and Bitterroot valleys of western Montana. A total of two hundred and fifteen males was collected in western Montana. Some were taken in every month of the year except December. In addition, twenty-five males were taken in southern Wisconsin during July, 1941, and August, 1940, and eleven were taken in Montana east of the continental divide during June and July, 1942. Birds from Wisconsin and eastern Montana are excluded from all calculations unless specific reference to them is made. Dr. H. C. Oberholser examined some of the birds from western Montana and wrote that they were Thick-billed Red-wings (*Agelaius p. fortis*).

The spring migration begins in western Montana in early March and continues into April. Since western Montana does not lie along an important flyway, it is doubtful if there are large numbers of spring migrants which do not remain to breed. The earliest migrants are largely males and the latest largely females, although adult and year-old males and females may be found in the same flocks throughout the spring migration. The first nests are built in early May, and the first juvenal birds are commonly seen in mid-June. By early July many of the adults have left their nesting territories, but a few are still feeding young as late as the fourth week in July. The young and some of the adults begin to form loose flocks by mid-July. Most of the birds migrate from the region before the first of November, although some birds may be found throughout the winter. We do not know whether the wintering birds are birds which breed locally and have lost the migratory habit or whether they represent birds which have come from



Fig. 8. Wings of year-old and adult male Red-wings taken in April and May. Four in upper row and two on left in lower row from year-olds, two on right in lower row from adults.

breeding grounds farther north. In one series taken in January the birds were definitely larger (10-20 gm.) than breeding birds, but other winter specimens were the same size.

Male Red-wings occur in three distinct plumages according to the age of the bird. These plumages and the associated molts are discussed by Dwight (1900), Forbush (1927), Ridgway (1902), and others; they will not be described in detail here. The juvenal plumage, which is somewhat like that of the adult female, is carried from the time the bird leaves the nest until the postjuvenal molt which may begin from late July until late August. The postjuvenal molt is complete and the immature bird then resembles somewhat the adult male, but the black contour feathers are more heavily edged with brown and the wing coverts instead of being the Scarlet Red (Ridgway, 1912) of the adult range through the less intense reds into orange and yellow with varying amounts of black. This plumage is worn until the following July when the molt into adult plumage begins. Adult males have a single, complete, postnuptial molt beginning in July. Forbush (1927) states that some of the wing coverts of the yearling may be replaced in the spring. Ridgway (1902) writes that the wing coverts of the young males taken in the winter are less intensely colored than they are in the spring. We have seen no evidence of molting of these wing coverts except during the usual molting time as described above. Thus we feel that any late winter or early spring molting of wing coverts in the yearling males must be quite rare if it occurs at all. Ridgway also points out that great individual variation exists in the degree of "adulthood" of the first-winter plumage. Allen (1914) also was impressed by the great variation in the plumage of the year-old birds and believed that the most adult-appearing birds were two-year-olds. Figure 8 shows marked plumage differences in spring-taken birds, especially in the coloration of the wing coverts.

In this work young birds taken during June, July, and August are called juveniles. From September through January they are called immatures, and from the beginning

of March until the inception of the molt into second-winter plumage in July, when they become indistinguishable from adults, the birds are called year-olds. All other birds, those over 13 to 15 months of age and in adult plumage, are called adults. In order to be sure that the birds in the so-called first-winter plumage were actually young birds and did not represent adults in another color phase, many of the birds obtained during late summer and fall were examined for the presence of the bursa of Fabricius which is known to be a reliable age character since it is present in the young birds and absent in adults (Gower, 1939). Birds in juvenal and first-winter plumage were found to have the bursa well developed while it was absent in all birds in adult plumage in which search was made. The bursa was last seen as a scarcely discernible vestige in immatures taken in January, but it could not be found in birds taken in March. Several birds taken during the molt in July and August showed only these combinations: (1) first-winter plumage replacing juvenal plumage, (2) adult replacing first-winter plumage, and (3) adult replacing adult. We are convinced, then, that the birds obtained during the spring which are in the so-called first-winter plumage actually are yearling birds. That none of the birds in adult plumage are actually year-olds we are also reasonably certain. The employment of the bursa technique further makes it quite certain that birds which Allen (1914) suggested might be two-year-olds are actually year-olds. Packard (1936) in describing the plumages of the Eastern Red-wing as an aid to bird-banders in properly sexing and aging trapped birds mentions difficulty in distinguishing the immature and adult male plumages in museum specimens. In most instances we had no difficulty in distinguishing between these plumages even when the birds were at a considerable distance in the field. The plumages of almost all of the 115 birds taken in this study which were classed as immatures and year-olds were so distinct that there could be no doubt as to their age. Only two or three specimens had plumages very nearly like those of adults (see fig. 8, second from left in lower row). The only one of these which was taken in the fall possessed a well-developed bursa of Fabricius typical of immature birds.

Most of the birds for March, April, and May were taken in 1940; the summer birds were taken in 1942 and 1943; and the fall and winter birds were taken in 1941 and 1942. We saw no evidence of any pronounced annual variation in the testis cycle.

All birds were shot with a rifle or shotgun and the testes were removed immediately and placed in Bouin's fluid. Large testes were bisected with a razor blade after they had been in the fixative for a few minutes. Upon return to the laboratory the extraneous material was removed from the testes and they were weighed on a precision balance. In most studies of the sexual cycles of birds the gonads have been measured with calipers or the volume calculated. We think that weighing the testes on a fine balance gives more accurate indication of their size than the other methods. Usually the combined weight of both testes was recorded, although when one testis was punctured by the bullet or shot, the weight of the intact testis was doubled. This involved some error but since either testis may be the larger it was not possible to make a correction. If both testes were destroyed, the bird was discarded. After fixation, one testis was sectioned at 7 or 8 μ and stained in Heidenhain's or Erlich's hematoxylin.

The carcasses of all birds were weighed upon return to the laboratory. In many cases desiccation materially reduced the recorded weights. From specimens in which drying was not excessive, it was found that the normal weight of both adult and year-old males was close to 72 gm. The body weights of the young and adult birds were not found to differ markedly.

Acknowledgment.—We are indebted to B. W. Brink, who helped materially in col-

lecting birds in the spring of 1940; to Dr. R. K. Meyer, who made helpful criticisms; and to Professor M. S. Morris, who made suggestions on the statistical work.

RESULTS

Changes in testis size.—The data on testis weights are summarized in table 1. When the young birds leave the nest at 10 to 12 days of age, their testes weigh under 2 mg. During the few weeks following the nestling stage a slight increase in testis weight was found so that the July specimens showed average testis weights of 3 mg. By August the testes have decreased in size slightly and they remain at this minimum (average 1.5 mg.) until after mid-January. Birds taken in early March (now called year-olds) showed slight increases in testis weight, and the growth continued slowly through March and early April. A period of most rapid growth occurred in late April so that in early May all birds taken (29) had testes weighing over 300 mg. Maximum testis weights in year-olds were obtained from birds taken the second and third weeks of May (9 birds,

Table 1

Type of bird	Month	No. in sample	Mean testis weight in mg.	Standard deviation	Minimum	Maximum	Coefficient of variation
Juvenile	June	2	1.9	0.71	1.4	2.4	37.4
	July	7	3.0	0.43	1.6	4.2	14.4
	August	5	1.4	0.26	1.2	1.8	18.6
Immature	September	11	1.6	.....	.....	.....	.....
	October	5	1.5	0.33	1.2	2.0	22.0
	November	5	1.5	0.51	0.8	1.9	34.0
	December	0	.....	.....	.....	.....	.....
	January	3	1.3	0.31	1.0	1.6	23.8
	February	0	.....	.....	.....	.....	.....
Year-old	March 1-15	5	4.6	0.83	3.8	5.0	18.0
	March 16-31	6	17.1	12.13	7.6	34.0	71.0
	April 1-15	6	103.6	122.90	18.6	302.2	118.6
	April 16-30	13	435.4	205.01	92.8	732.0	47.1
	May 1-15	29	575.5	110.65	339.0	767.0	19.2
	May 16-31	3	637.9	69.35	589.4	717.4	10.9
	June 1-15	4	476.3	176.74	372.0	614.8	37.1
	June 16-30	5	388.1	207.76	162.6	515.0	53.5
	July 1-15	2	14.1	11.45	6.0	22.2	81.2
	July 16-31	1	3.2	.....	.....	.....	.....
Adult	August	8	3.1	1.35	1.6	6.0	43.4
	September	3	2.0	0.57	1.4	2.5	28.5
	October	4	3.4	0.91	2.0	5.2	26.8
	November	5	3.9	1.61	2.2	6.4	41.3
	December	0	.....	.....	.....	.....	.....
	January	9	3.3	1.09	2.0	5.3	33.0
	February	6	12.9	4.01	8.5	17.8	31.1
	March 1-15	16	25.1	8.17	8.8	41.2	32.5
	March 16-31	17	100.8	84.51	20.0	366.0	83.8
	April 1-15	6	646.4	295.31	358.6	1089.0	45.7
	April 16-30	8	748.9	250.82	230.0	1061.4	33.6
	May 1-15	11	862.5	193.52	571.4	1212.8	22.4
	May 16-31	3	857.2	43.86	809.6	896.0	5.1
	June 1-15	4	888.7	214.47	806.4	1068.6	24.2
	June 16-30	4	954.2	145.15	841.6	1166.2	15.2
	July 1-15	7	120.2	193.57	14.6	551.6	161.0
	July 16-31	2	4.7	0.02	4.6	4.8	0.4

average 647 mg.). By the first of June the testes of some of the year-olds have already begun regressing and in the few July specimens available the testes were approaching the minimum. The molt which begins in July makes these year-olds indistinguishable from the adults.

The testes of the adults were at the minimum (average 3.2 mg.) from mid-August until late January, but during this time they were larger than those of the juveniles and immatures for the corresponding period. Growth was found to begin in late January and the period of most active increase was in early April. The maximum weights were reached in most instances by late April (average weight of testes at the maximum 925 mg.) and no important changes in weight occurred until late June. At this time the testes of some of the birds had begun to regress while those of others remained active until early July. It may be seen from table 1 that regression proceeds at a considerably faster rate than does recrudescence.

The testes of the adults are consistently larger than those of the year-olds and immatures throughout the year. The period of most active growth in the adult testes precedes that in the year-olds by three weeks, and the average maximum testis weight of the adults is nearly 300 mg. larger than the same figure for the year-olds.

With data of the sort here available it is impossible to state exactly how long the testes of any one bird might be expected to remain at maximum size. Testes of maximum size were taken from adult birds first on April 13 and last on June 17, but some of the birds taken on July 5 showed testes just beginning regression. Testes from adults which were not at the maximum were taken on May 3 and again on July 5. Judging from the small size of some of the testes taken on this latter date, regression must have started by the beginning of the fourth week of June. From these data it can be seen that the testes of any single adult could remain at the maximum from 50 to 75 days. Analysis of similar data from year-olds shows that the period during which the testes could be at the maximum varies from 30 to 55 days, the month of May being the only period during which the testes of all year-olds seem to be at the maximum.

The standard deviations and coefficients of variation supplied in table 1 are calculated from rather small samples and for that reason are not to be regarded as precise values. They are supplied only to show that variation in testis weights is greater when the testes are increasing or decreasing than when they are at the maximum or the minimum. The testis weights of adults taken in early July showed the greatest variation (coefficient of variation was highest), when regression in some was almost complete and in others just beginning.

Histology of the testes.—A detailed description of spermatogenesis for the Red-wing is deemed unnecessary, because there have been so many studies made of spermatogenesis in various species of passerine birds (for example, Rowan, 1928; Bissonnette and Chapnick, 1930; Bissonnette, 1930; Kirschbaum and Ringoen, 1936; Blanchard, 1941; Wolfson, 1942; Bullough, 1942). Blanchard has delimited seven stages in the progress of spermatogenesis in the White-crowned Sparrow which are useful in this study. These stages which are described in some detail by her will only be named here: stage 1, the inactive condition; stage 2, the first change from the inactive condition; stage 3, marked increase in germinal elements and interstitial cells; stage 4, appearance of primary spermatocytes in synapsis; stage 5, predominance of primary spermatocytes in synapsis; stage 6, spermatids present; and stage 7, breeding condition. The Red-wing material conforms to Blanchard's descriptions except that spermatozoa were commonly found free in the lumens of the tubules of the testes of the White-crowned Sparrow, but seldom found in the Red-wing. However, the seminal vesicles of Red-wings in

breeding condition were packed with sperm, so there would need be no release of sperm from the testis at the time of copulation as Rowan (1928) has suggested might occur in the Slate-colored Junco (*Junco hyemalis*).

We were unable to find Blanchard's stage 2 represented in our material, but this stage probably occurs in late January in the adult birds and in February for the year-olds, and we have no material taken at these times. Table 2 summarizes the data on the dates the various stages were first seen and also the time when the majority of specimens had reached each stage. The delay in the development of the testes of the year-olds by approximately three weeks is brought out clearly by the figures in this table.

Table 2

Blanchard's stages	Year-olds				Adults			
	Date stage first seen	Weight of testes showing stage	Date stage shown by majority of birds	Av. wt. of testes showing stage	Date stage first seen	Weight of testes showing stage	Date stage shown by majority of birds	Av. wt. of testes showing stage
Stage 3	March 2	3.8	March 2	4.2	Feb. 9	8.5	Feb. 9	9.1
Stage 4	March 22	9.6	March 30	21.1	Feb. 16	14.4	Feb. 16	14.1
Stage 5	March 24	34.0	April 13	115.8	March 2	35.4	March 9	40.6
Stage 6	April 13	211.0	April 20	328.5	March 24	140.6	March 30	184.1
Stage 7	April 13	302.2	April 20	328.5	March 30	366.0	April 6	498.8

It is important to emphasize that all of the 29 year-old birds taken during the first half of May showed testes in active spermatogenesis. Spermatogenesis continues until late June in the adults, but only until mid-June in the year-olds.

Tubule diameters.—Average diameters of the seminiferous tubules were calculated for most testes. The slides were projected on to the ground glass of a photomicrographic camera at varying magnifications depending on the size of the testis. The diameters of the tubules were obtained by calculation from measurements of the projected image. Fifty measurements of the diameters of tubules chosen at random were made from each testis and in each case the smallest diameter was measured to avoid unduly large measurements due to the coiling of the tubules. Even for specimens exhibiting the most variation this size of sample was large enough to insure that the calculated mean was within 5 per cent of the true mean on the basis of a probability of 95 per cent. Many

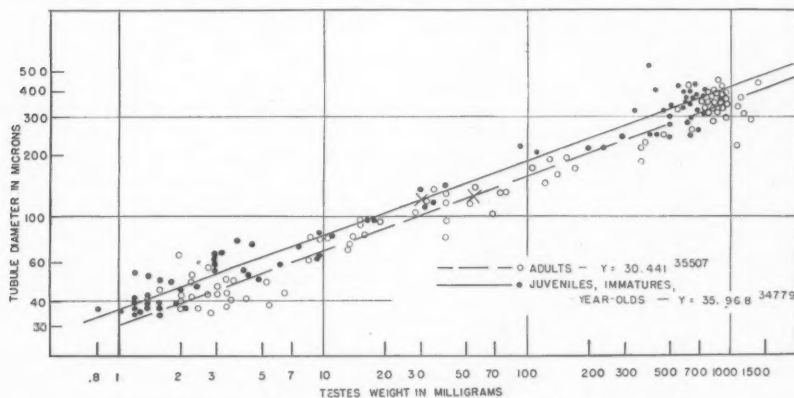


Fig. 9. Double logarithmic plotting of the relation of tubule diameters to testis weights.

specimens, the smaller testes in particular, exhibited means within the 5 per cent limits for a probability of 99.5 per cent. All of the figures obtained in this fashion except those of testes in regression were plotted on double logarithmic paper (fig. 9) which was necessary to rectify the values. Equations were calculated to show the relationship during growth between testis weights and tubule diameters by the method of least squares as described by Simpson and Roe (1939:364). The equations show that as the testis weights increase, the tubules increase in diameter but at a slower rate. The calculated values in the equations express the precise nature of this relation. The equations obtained for the growth of the adult testes from the minimum to the maximum differed from the equation for the growth of the juvenal, immature, and year-old testes. The equations where X is the testis weight and Y the tubule diameter follow:

$$Y = 30.441X^{.35507} \text{ (for adults)}$$

$$Y = 35.968X^{.34779} \text{ (for juveniles, immatures, and year-olds)}$$

It is readily seen from figure 9 that the tubules of the small testes of the juveniles, immatures, and year-olds have greater diameters in proportion to the testis weights than those of the adults. This is due to a difference in the amount of the intertubular material in these small testes, a situation which will be discussed later. It is not to be inferred that the tubules of testes of the adults are smaller than those of the juveniles, immatures, and year-olds when compared by month, for such is the reverse of the actual situation, as is pointed out beyond.

Difference between adult and juvenal and immature testes during the quiescent period.—Studies were made to determine what monthly changes occurred in the testes and what differences there were between the testes of adults and juveniles and immatures during the quiescent period. Fisher's method of analysis of variance allows the analysis of a series of data for two criteria with a single set of calculations. Accordingly this method, as described by Snedecor (1940), was employed to test the validity of suspected differences. The data on testis weights as analyzed are summarized as follows:

Month	Adult		Juvenile and immature	
	No. in sample	Mean value of testis weight	No. in sample	Mean value of testis weight
August	8	3.1	5	1.4
September	3	2.0	1	1.6
October	4	3.4	5	1.5
November	5	3.9	5	1.5
January	9	3.3	3	1.3

It appears that the testes of the adults are consistently larger than those of the juveniles and immatures and that there is no significant difference within each group by months. The results of the analysis of variance test follow:

	Calculated F	F for probability of 1 per cent
Difference in testis weights between ages	38.63	7.35
Difference in testis weights between months	0.77	3.86

The very high calculated value of F for the difference in testis weights between ages in contrast to the significant value of F taken from the table in Snedecor shows that the difference in testis weights by ages is significant. In other words, the observed differences in testis weights could have occurred by chance, where no real difference exists, less than once in a hundred cases. The value of F for the difference between months being smaller than the significant value of F shows that the variation in testis weights by month is not significant.

The data obtained on tubule diameters for use in the previous section on the relation of tubule diameters to the weight of the testes are considered again here to determine what differences exist in tubule diameters when the specimens are compared by month and by ages. The data are summarized as follows:

Month	Adult		Juvenile and immature	
	No. in sample	Mean value for tubule diameter in μ	No. in sample	Mean value for tubule diameter in μ
August	8	49.3	4	45.2
September	3	40.7	1	33.9
October	4	46.0	8	39.3
November	5	40.3	5	37.3
January	8	41.4	3	36.2

The indications are that the tubules of the adult testes are significantly larger than those of the juveniles and immatures and that there is a decrease in tubule size from August to January in both groups. The very high calculated values for F below, in contrast to the significant value of F, show that this is undoubtedly true.

	Calculated F	F for probability of 1 per cent
Difference in tubule diameter between months	7.56	3.84
Difference in tubule diameter between ages	13.53	7.33

Intertubular tissue.—The cells of the testes which are commonly thought to produce male hormone are the Leydig cells of the intertubular spaces. As pointed out by Pfeiffer and Kirschbaum (1943), most of the evidence for this view has been obtained from mammalian material, and these authors state that while many workers have described Leydig cells from avian testes, others have been unable to find them. Apparently Leydig cells occur in the testes of the Red-wing only during the early stages of active growth. They are not as abundant then as in mammalian testes, but they are by no means rare (fig. 10). Leydig cells appear to be absent when the testes are at the maximum, during regression and during the inactive period. As has been found in other avian studies, when testes are at the minimum, the intertubular tissue is relatively most abundant. As they undergo growth in the spring, the tubular tissue increases at a rapid rate; yet there is only slight growth in the intertubular tissue so that by the time the tubules have reached maximum size the intertubular tissue appears to be almost entirely absent because it has become such a relatively small proportion of the total testis. The very small amount of intertubular tissue in active testes makes quantitative studies of it impractical at this time.

Since the first analysis-of-variance test shows that there was no change in the testis weights by month during the quiescent period, and the second test shows that the tubule diameters decreased during the period, it is apparent that either the tubules are increasing in length as they decrease in diameter or else there is an increase in the intertubular tissue. The former suggestion is unreasonable. Examination of the slides suggests that the intertubular tissue is increasing and that the adult testes have relatively more intertubular tissue during this quiescent period than juvenile and immature testes.

In order to study these apparent differences, the method of Bascom (1925) was employed. Representative sections of each testis from all birds obtained between August and mid-January were projected with a photomicrographic camera on papers of uniform thickness and the outlines of the tubules traced in with pencil. The pieces of paper with the areas representing the tubules were cut apart from the intertubular areas with scissors and the two sets of paper fragments weighed separately and the percentage of each

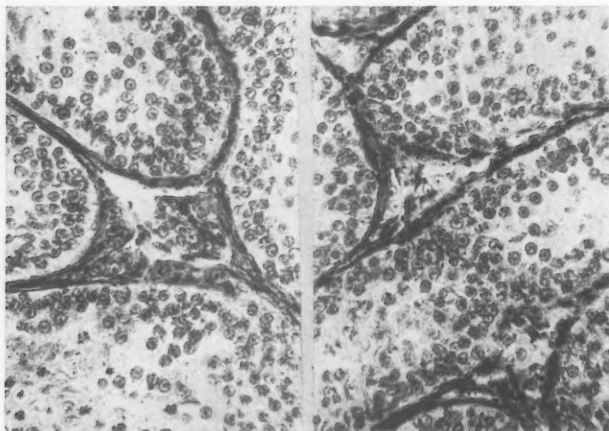


Fig. 10. Photomicrographs of Red-wing testes to show Leydig cells, $\times 300$. At left, section of adult testis weighing 23.2 mg. taken on March 2. At right, year-old testis weighing 10.6 mg. taken on March 30. Both testes exhibit stage 4 of Blanchard, where there are a few primary spermatocytes in synapsis in the centers of the tubules. It is at this stage that Leydig cells are most conspicuous in the Red-wing. These large interstitial cells lie in groups in the spaces between the tubules. The nuclei which are as large as those of the spermatogonia within the tubules are much larger than those of the connective tissue cells lying along the outer edge of the tubules. Note the characteristic distinct nucleolus in the nucleus of each Leydig cell.

calculated. Five representative sections were taken from each testis and the values averaged. The results were then subjected to the analysis of variance method to calculate their significance. The data as analyzed are summarized as follows:

	Adults		Juvenile and immature	
	No. of specimens	Mean value for percentage of tubules	No. of specimens	Mean value for percentage of tubules
August	8	48.4	4	55.2
September	3	45.5	1	46.0
October	4	46.4	6	48.5
November	5	45.2	5	49.4
January	9	42.8	3	45.1

The figures appear to indicate that the relative amount of tubular tissue decreases from August to January, and that the percentage of tubular tissue is less in testes of adults than those of juveniles and immatures. The results of the analysis-of-variance test are:

	Calculated F	F for probability of 1 per cent
Difference in percentage of tubular tissue between months	4.42	3.86
Difference in percentage of tubular tissue between ages	9.54	7.35

The calculated values for F, higher in both cases than the table values for a probability of 1 per cent, clearly indicate that the observed differences are real. Whether or not these differences are indicative of a differential rate of hormone production between

the ages is doubtful. In this connection it is to be noted that Pfeiffer and Kirschbaum (1943) conclude that the intertubular areas in birds normally seem not to be the site of male hormone production. Typical Leydig cells were not found in the testes of either adult or juvenal and immature Red-wings taken during the quiescent period. It is likely that androgen production in both age groups during this time is negligible.

Testis regression in relation to the molt.—The presence or absence of molting and the degree to which it had proceeded were recorded in all birds obtained in the course of the molting period. Since many of the birds obtained in Wisconsin were taken in the molting period and since the molting time differs by some two or three weeks from the corresponding time in Montana, data from the Wisconsin birds are discussed in this section. The 26 adult males obtained from July to September seemed to show a correlation between the degree of completion of the molt and the size of the testes. When the presence or absence, or the extent of the molt were assigned to five classes and the testis weights assigned to 8 classes (2.4 mg. intervals), a correlation coefficient was calculated. The value obtained, $r = 0.76$ with P less than one, indicates highly significant correlation. The molt begins when the testes have regressed to a weight of about 20 mg. and decrease in testis size continues so that by the time the molt is complete the testes are at the minimum size. Molting in adult males was first detected in Montana specimens on July 10, although corresponding stages in the molt were not obtained in Wisconsin until August 1. In spite of the differences in time of the beginning of the molt in the two localities the testes were of the same size when the molt started. That the physiological factors which bring about the regression of the testes may also bring about the molt is strongly suggested by the above data.

Observations made on two collecting trips suggest that those males which take part in the rearing of second broods remain in breeding condition longer than those which raise only one brood. On July 5, 1941, four adult males were obtained in Wisconsin. The testes of three were still near the maximum, whereas the fourth bird's testes had regressed considerably (56.0 mg.). On July 10, 1943, in western Montana three adults were obtained. Two had left the region of their territories and had started the molt, whereas the third was still defending its territory, was engaged in feeding young, and had not begun the molt. Although the differences in testis weights were not striking, the last bird had somewhat larger testes (25.0 mg.) than the other two (17.5 mg.).

Even though the year-old's testes regressed sooner than those of the adults, from the eleven specimens available during July and early August it does not appear that the molt starts any earlier than in the early molting adults.

DISCUSSION

It is well known that adult male Red-wings establish territories on the breeding grounds which they defend against other male Red-wings (Allen, 1914, and Smith, 1943). These authors point out that the territories are established by the males some time before nesting begins. Our observations, which were confined to the time spent in collecting the birds, indicate that very few year-old males establish territories. When they are approached during the breeding season, they often fly distances of several hundred yards and are consequently more difficult to collect than the adults which remain in the vicinity of their territories. When nests with young are present, the adult males are often as active in flying at the intruder as are the females. This type of behavior was rarely seen among the year-old males. We did observe four of the latter which were definitely defending territories. One in particular in Toole County, Montana, east of the divide, on July 1, 1942, had two females in attendance and young just able to fly were found close by. Since there were no other male Red-wings seen in the

vicinity, it can hardly be doubted that this bird was breeding. Three other year-olds defending territories were found in the vicinity of other nesting birds, but we are unable to state definitely that the females in the vicinities of their territories were mates of these year-olds rather than of the adult males in the same area. All four of the above-mentioned year-olds were collected. Although two of them had testes which were larger than the average for year-olds taken at that time, the other two did not.

The observation that year-old males are in active spermatogenesis during the breeding season, but that very few individuals appear to breed, leads one to suspect that the failure to mate is a psychological phenomenon that purely anatomical studies can not explain. If the psychological behavior associated with the whole breeding process is conditioned by the physiological state of the reproductive system, it is indeed possible that the year-old males, coming into sexual activity at a later date than the adults, may find the females already mated with the adult males and be left out of the breeding activity. Perhaps the smaller testes of the year-old bird are producing less male hormone which in turn would render the bird less aggressive and less able successfully to compete with adult males in maintaining a territory. That the aggressive nature of birds may be due to the amount of male hormone present is suggested by Allee (1942). He found that in female fowls injections of male hormone enables a bird, which is socially at the bottom of the series of birds it is caged with, gradually to ascend through the ranks until it dominates all the birds which formerly dominated it.

Noble and Vogt (1935) observed that a year-old Red-wing attempted copulation with a taxidermic mount of a female and then hastily retreated. Our observations indicate that the year-old males often chase females about the nesting area, but they in turn are chased away by the adult males. Perhaps the year-old males are deliberately avoided by the females as mates because of their less spectacular plumage.

Bullough (1942) in an extensive study of the sexual cycle of the Starling (*Sturnus vulgaris*) on the British Isles found that the year-old male does not breed and that it does not come into active spermatogenesis until two years old. He found some increase in the size of the testes of the year-olds in the spring so that they reached a stage in April with primary spermatocytes in synizesis stages, although none was found in which spermatozoa had been produced. Whether or not the yearling males of the same species of starling in this country exhibit only partial development of the testes without spermatozoa being produced is not answered by study of the papers of Bissonnette and Chapnick (1930) and Bissonnette (1930). Steinbacher (1936) states that Starlings regularly breed at the age of one year in Hungary, but they do so only rarely in Latvia.

Male English Sparrows (*Passer domesticus*) undoubtedly go into active spermatogenesis and probably breed at one year of age since Kirschbaum and Ringoen (1936) found that the juvenal male can not be distinguished from the adult after the latter part of January, and they describe no birds with testes in the inactive state in the spring season. In the White-crowned Sparrow (*Zonotrichia leucophrys*) the year-old birds are distinguishable from the adults by plumage differences and young birds come into active spermatogenesis and breed (Blanchard, 1941). Wolfson (1942) states that in the Oregon Junco (*Junco oreganus*), where the ages are distinguishable in the fall but not in the spring, the testes of experimental birds of both ages responded alike to experimental light conditions and reached the breeding condition.

It is of interest that the testes of adult Red-wings may remain in the fully developed condition for more than two months and according to Bullough (1942) those of the Starling are at the maximum only during April, yet both species produce spermatozoa over a sufficiently long period so that two broods of young may be produced. Bullough

also found that the testes of juvenal Starlings were larger during June than they were later during the year, thus the Red-wing and the Starling are similar in showing slight increase in the testes just after the young have left the nest. Both Bissonnette and Chapnick (1930) and Bullough (1942) find that the testes of adult Starlings begin to grow slightly during the fall months and continue the growth to the next spring. The testes of the English Sparrow according to Kirschbaum and Ringoen (1936) undergo no growth until late January, the same condition as found in the Red-wing.

Among passerine birds in which the males do not commonly breed in the first year several are icterids: Tri-colored Red-wing, *Agelaius tricolor* (Lack and Emlen, 1939), Boat-tailed Grackle, *Cassidix mexicanus* (McIlhenny, 1937), Yellow-headed Blackbird, *Xanthocephalus xanthocephalus* (Fautin, 1940) and the species under discussion. It is perhaps no coincidence that these are all species in which plumage differences readily distinguish the adult male from the year-old. It is generally assumed that birds do not reach sexual maturity until they are in adult plumage, although there are exceptions, for example, several species of gulls, hawks, and herons (Mayaud, 1941), the White-crowned Sparrow (Blanchard, 1941), and the Orchard Oriole, *Icterus spurius* (Ridgway, 1902). With species which acquire their breeding plumage during a partial spring molt it is clear that the state of the reproductive system may determine the nature of the plumage acquired when it is under hormonal control. Thus, the male Indigo Bunting (*Passerina cyanea*) and the African Orange Weaver Finch (*Pyromelana franciscana*), which acquire the nuptial plumage in the spring, are believed to develop those plumages as a result of stimulation by gonadotropic hormones (Witschi, 1935 and 1936). The nuptial plumage of the male Ruff (*Philomachus pugnax*) develops as a result of stimulation from testis hormone (Van Oordt and Junge, 1934 and 1936). In the Red-wing, and we assume the other blackbirds as well, the adult and year-old plumages develop in July and August at a time when the size of the testes is close to the minimum and when it is likely that both testis hormone and gonadotropic hormones are at the minimum. Therefore, it is difficult to believe that male hormone in differential rates of production in the adult and juveniles could produce the two types of plumage. Whether or not the plumages of the male Red-wing are under hormonal control can not be ascertained without experiments performed in the laboratory.

As mentioned previously the variation in the first-winter plumage is considerably greater than that in the adult plumage. Ridgway (1902) believes that the plumage differences in the immature are correlated with age differences. Since young birds are hatching from late May until early July in western Montana, there may be considerable difference in age at the postjuvinal molt. That birds which hatch earliest come into the most adult-like plumage, whereas the late hatched birds molt into the immature-like plumage is suggested, but not proved, by our data. It was also thought that there might be some correlation between the nature of the plumage and the size of the testes in year-old birds taken in the spring, the more adult-like year-olds having larger testes than the immature-like ones. A series of 16 year-olds taken on May 4, 1941, to test this supposition, however, indicated no significant correlation.

The occasional appearance of a female Red-wing with red or orange wing coverts similar to those of the yearling males is of interest. Baird (1858) has described one such bird which he stated was "barren." We took two females with bright wing patches, in both cases mistaking them for year-old males before they were shot. One was taken in May and was in breeding condition, and the other taken in July apparently was normal sexually as its reproductive tract was similar to those of other females taken on the same date, and it possessed a brood patch.

SUMMARY

A study of the testis cycle of the Red-wing based on 215 birds taken in western Montana and 36 taken in eastern Montana and in southern Wisconsin leads to the following conclusions:

1. The year-old birds as well as the adults come into active spermatogenesis in the spring. The testes of the year-olds grow to a maximum of two-thirds that reached by the adults.
2. The testes of the year-olds reach the maximum in May three weeks later than those of the adults.
3. Most of the year-olds do not develop territories and thus do not breed. A few do breed, however.
4. The testes of the adults are maintained at the maximum from 50 to 75 days, but in the year-olds the period is from 30 to 55 days.
5. Equations showing the relation of tubule diameters to testis weights were calculated for both age groups.
6. During the quiescent period, August to January, the testes of the adults are larger, have larger tubules and more intertubular tissue than those of the juveniles and immatures. In both groups there is a progressive decrease in tubule diameters from August to January.
7. The state of regression of the testes in the adult is significantly correlated with the progression of the postnuptial molt.
8. Great variation in the plumage of the year-olds was noted, but no correlation between this variation and the testes was discovered.

LITERATURE CITED

- Allee, W. C.
1942. Social dominance and subordination among vertebrates. Biol. Symp. (Lancaster, Penn., Jacques Cattell Press), VIII:139-162.
- Allen, A. A.
1914. The red-winged blackbird: a study in the ecology of a cat-tail marsh. Abs. Proc., Linn. Soc. N. Y., 24-25:43-128.
- Bailey, F. M.
1917. Handbook of birds of the western United States (Boston and New York, Houghton Mifflin Company), 5th ed., lii + 590 pp.
- Baird, S. F.
1858. Birds. Pac. Railroad Repts., vol. 9, pt. 2, lvi + 1005 pp.
- Bascom, K. F.
1925. Quantitative studies of the testis. I. Some observations on the cryptorchid testes of sheep and swine. Anat. Rec., 30:225-241.
- Bissonnette, T. H.
1930. Studies on the sexual cycle in birds. III. The normal regressive changes in the testes of the European starling (*Sturnus vulgaris*) from May to November. Amer. Jour. Anat., 46:477-497.
- Bissonnette, T. H., and Chapnick, M. H.
1930. Studies on the sexual cycle in birds. II. The normal progressive changes in the testis from November to May in the European starling (*Sturnus vulgaris*), an introduced, non-migratory bird. Amer. Jour. Anat., 45:307-343.
- Blanchard, B. D.
1941. The white-crowned sparrows (*Zonotrichia leucophrys*) of the Pacific seaboard: environment and annual cycle. Univ. Calif. Publ. Zool., 46:1-178.
- Bullough, W. S.
1942. The reproductive cycles of the British and continental races of the starling (*Sturnus vulgaris* L.). Phil. Trans. Roy. Soc. London, Ser. B, 231:165-246.
- Chapman, F. M.
1934. Handbook of birds of eastern North America (New York and London, D. Appleton-Century Co., Inc.), 2nd rev. ed., xxxvi + 581 pp.

- Dwight, J., Jr.
1900. The sequence of plumages and moults of the passerine birds of New York. *Annals N. Y. Acad. Sci.*, 13:73-360.
- Fautin, R. W.
1940. The establishment and maintenance of territories by the yellow-headed blackbird in Utah. *Great Basin Nat.*, 1:75-91.
- Forbush, E. H.
1927. The birds of Massachusetts and other New England states (Boston, Mass. Dept. Agr.), 2:1 + 461 pp.
- Gower, W. C.
1939. The use of the bursa of Fabricius as an indication of age in gamebirds. *Trans. Fourth N. Amer. Wildl. Conf.*: 426-430.
- Kirschbaum, A., and Ringoen, A. R.
1936. Seasonal sexual activity and its experimental modification in the male sparrow, *Passer domesticus* Linnaeus. *Anat. Rec.*, 64:453-473.
- Lack, D., and Emlen, J. T., Jr.
1939. Observations on breeding behavior in tricolored red-wings. *Condor*, 41:225-230.
- McIlhenny, E. A.
1937. Life history of the boat-tailed grackle in Louisiana. *Auk*, 54:274-295.
1940. Sex ratio in wild birds. *Auk*, 57:85-93.
- Mayaud, N.
1941. Quelques cas de reproduction d'oiseaux sous un plumage immature. *Bull. Mens. Soc. Linn. Lyon*, 10:61-64.
- Noble, G. K., and Vogt, W.
1935. An experimental study of sex recognition in birds. *Auk*, 52:278-286.
- Packard, F. M.
1936. Notes on the plumages of the eastern red-wing. *Bird-Banding*, 7:77-80.
- Peterson, R. T.
1939. A field guide to the birds (Boston, Houghton Mifflin Company), rev. ed., xxii + 180 pp.
1941. A field guide to western birds (Boston, Houghton Mifflin Company), xx + 29 pp.
- Ridgway, R.
1902. The birds of north and middle America. *Bull. U. S. Nat. Mus.*, 50, pt. 2:xx + 834 pp.
1912. Color standards and color nomenclature (Washington, D.C., published by the author), iv + 43 pp., 53 pls.
- Rowan, W.
1929. Experiments in bird migration. I. Manipulation of the reproductive cycle: seasonal histological changes in the gonads. *Proc. Boston Soc. Nat. Hist.*, 39:151-208.
- Simpson, G. G., and Roe, A.
1939. Quantitative zoology (New York and London, McGraw-Hill Book Company, Inc.), viii + 414 pp.
- Smith, H. M.
1943. Size of breeding populations in relation to egg-laying and reproductive success in the eastern red-wing (*Agelaius p. phoeniceus*). *Ecol.*, 24:183-207.
- Snedecor, G. W.
1940. Statistical methods applied to experiments in agriculture and biology (Ames, Iowa, Collegiate Press, Inc.), 3rd ed., xiii + 422 pp.
- Steinbacher, J.
1936. Zur Frage der Geschlechtsreife von Kleinvögeln. *Beitr. zur Fortpfl. Vögel*, 12:139-144.
- Van Oordt, G. J., and Junge, G. C. A.
1934. The relation between the gonads and the secondary sexual characters in the ruff (*Philomachus pugnax*). *Latv. biol. Biedr., Raksti*, 4:141-145.
1936. Die hormonale Wirkung der Gonaden auf Sommer- und Prachtkleid. III. Der Einfluss der Kastration auf männliche Kampfläufer (*Philomachus pugnax*). *Arch. für Entwckl. der Organ.*, 134:112-121.
- Witschi, E.
1935. Seasonal sex characters in birds and their hormonal control. *Wilson Bull.*, 47:177-188.
1936. Effect of gonadotropic and oestrogenic hormones on regenerating feathers of weaver finches (*Pyromelana franciscana*). *Proc. Soc. Exp. Biol. Med.*, 35:484-489.
- Wolfsen, A.
1942. Regulation of spring migration in juncos. *Condor*, 44:237-263.
Montana State University, Missoula, Montana, January 6, 1944.

THE LIFE AND WRITINGS OF JAMES MOFFITT

By HILDA W. GRINNELL

James Moffitt was born in San Francisco on March 21, 1900, elder son of Dr. Herbert C. and Marguerite (Joliffe) Moffitt. His paternal grandfather, whose name he was given, was born in Enniskillen, Ireland, on February 10, 1827. While still an infant he was brought by his parents to New York. In 1849 he came to San Francisco, where on June 13, 1863, he was married to Delia Kennedy, born February 8, 1837, in County Meath, Ireland. This earlier James Moffitt was one of the stable citizens who took part in the lasting enterprises of the young city of San Francisco. Two of his ventures may be mentioned here: in partnership with Francis Blake he engaged in the printing business in 1853, and many of the first issues of the San Francisco newspapers were printed in their shop; he was one of the four men responsible for the building of San Francisco's first cable road.

James Moffitt, the grandson, grew up in the Bay Region and was married on September 30, 1922, at Ross, Marin County, to Elizabeth Schmiedell, herself of Californian pioneer stock. Their only child, a daughter, Alice, is the wife of Captain Richard Gatterdam, United States Army Air Force.

James entered the University of California at Berkeley in 1917, but shortly thereafter enlisted as a cadet in the United States Naval Reserve. Following the close of the war he returned for a short time to his college studies, leaving them, however, to become affiliated with the San Francisco firm of Blake, Moffitt and Towne. A business career proving too confining for one with his deep love of the out-of-doors, he found attractive a proffered appointment as a research assistant with the California Division of Fish and Game. The position was accepted and the connection, with some changes of title, was continued for three years. It terminated with Moffitt's resignation, tendered in May of 1934.

The summer which followed was largely spent at his vacation camp in Mendocino County, winter wren country, where primeval redwoods and Douglas firs shade the lesser growths of tan oak, alder and ash along the stream courses, but where Sonoran islands diversify the landscape on the westering ridges which separate the watersheds of the Garcia and Navarro rivers.

In October of that year came a long-anticipated eastern trip, the first of three such journeys, which brought opportunity to study geese in museum collections and to cement friendships with such men as Fred Kennard and John C. Phillips.

When in May of 1936 Moffitt was appointed Curator of Birds and Mammals in the California Academy of Sciences, his eastern experience with differing curatorial methods proved of value and was doubtless one of the factors influencing his determination to re-arrange the Academy's collection of sixty thousand birds skins in accordance with a modern system.

The months of time consumed in this work and in other curatorial labors postponed the completion of two papers on which Moffitt had for ten years expended much thought, a report on the birds of the Lake Tahoe region, and a study of the geese of North America. It is gratifying to know that the first-mentioned project is to be completed by Dr. Robert T. Orr and that the second is to be placed in equally competent hands.

It was inevitable that James Moffitt should be especially interested in the Lake Tahoe region, for from his fourth to his twentieth year all his summers were spent at



Fig. 11. James Moffitt in 1940.

the lake and many trips were taken far afield from there with his father, or with Bob Watson, an old time resident, who trapped in the winter and served as a packer and guide in the summer time and in the deer hunting season.

Many shorter vacation visits were made to the lake and one entire winter, in company with his wife and small daughter, was spent at Tahoe in order to study those hardy birds which remain through the period of deep snows.

Just when the way was clearing for intensive work on these papers, the Japanese attack on Pearl Harbor re-awakened the strong feeling of patriotism which had caused James Moffitt's enlistment in the first world war as a boy of eighteen. At first disqualified because of partial deafness in one ear, he persisted in seeking to be in active service. His patience and perseverance triumphed in his being sworn into service as a Lieutenant in the United States Naval Reserve, in San Francisco on April 22, 1942.

Assigned to duty as an officer on the staff of the Commander of a Fleet Air Wing in

the Aleutians, he rejoiced that his duties would take him to a region where waterfowl abound. A glimpse of what he found there is given in a letter dated April 9, 1943, and addressed to Alden Miller:

"I left Seattle nearly five months ago and that does seem a long time now. Have been to three places here since then, first one of bear fame for three weeks, then on, via a stop-over at the type locality of the westmost *Passerella iliaca*, to where Harrold did some collecting for the C.A.S., then the type locality for *Lagopus rupestris nelsoni*. There I spent Christmas, New Year's, and a little over two weeks' time. The big Rosy Finches were feeding in the streets, common, and perching on the house tops! Harlequins and Old Squaws, feeding and diving outside my window, along shore . . ."

"I have had two or three good bird walks. One, on Feb. 24, will interest you, because I saw 31 (all told) EUROPEAN Green-winged Teal (positive iden., close, through 8—glass). These, known to nest here, also apparently winter, as do many other surface feeding ducks—as—that same day: Mallard—20; Pintail—167; others, diving ducks: Amer. Goldeneye 2; Bufflehead 23; Old Squaw 6; Harlequin (very numerous here) 47; Amer. Scoter 21; Pac. Eider 21. To give you an idea of the littoral, plus lagoon and grassland & tundra birdlife that day (4 hours), in addition to the above I saw: Red-th. Loon 1; Pelagic Cormorant 4; Emperor Goose 37; Glaucous-w (Iden. not too sure) Gull 22; Bald Eagle 2; RAVEN 26; Winter Wren 4; Song Sparrow (the largest one) 9. You see that land birds are extremely scarce, in winter at least."

"I've had good chances to study the Emperor Geese, sometimes at 30 yards range, mad[d]ening when I can't shoot. They frequent rocky coast, much like the ocean off Tomales Point, and sit and feed (on what?, among algae), on small rocks, just off shore, near the surf. Harlequins & Old Squaws & Amer. Scoters, bob around them in the rough water. Usually, 12 to 25 geese will be on neighboring small rocks, but not more than 2 to 5 on a single one . . ."

With the longer hours of daylight and the better weather which he hoped would come with the lengthening days, James Moffitt planned to utilize every coming chance for further observations on the waterfowl of the Aleutian chain, but death came to him on July 2, 1943, in the crash of a naval transport plane at Dutch Harbor, Unalaska, ending a career which each year gave greater promise.

One of James Moffitt's contributions to western ornithology, and not a minor one, was his generous hospitality to bird students from other states and countries. Always ably seconded by Mrs. Moffitt, his every energy was bent toward giving these visitors as complete a picture of game bird conditions in California as their schedules permitted. On this mission his big red Buick travelled uncounted miles as he made such men as John H. Baker, Major Allan Brooks, Jean Delacour, Frederic Kennard, John C. Phillips and Peter Scott acquainted with California's shoreline, marshes, rice fields, gun clubs, and even the bleak plains of Modoc County.

James Moffitt joined the Cooper Ornithological Club in 1917. He became an associate of the American Ornithologists' Union in 1926, advancing to the rank of member in 1937. He joined the Audubon Association of the Pacific in 1936 and in 1941 served as its president. In October, 1941, his efforts in behalf of the conservation of wild life were recognized in his appointment to the board of directors of the National Audubon Society. Among other organizations with which he was associated were the California Academy of Sciences, which he joined at the age of nineteen and where, as before mentioned, he became Curator of the Department of Ornithology and Mammalogy in May of 1936; the British Ornithologists' Union; the Wilson Ornithological Club; the American Society of Mammalogists; the Grinnell Naturalists Society.

Of James Moffitt's seventy-seven published writings eleven concern deer. The first (Calif. Fish and Game, 12, 1926:124-127) was printed some seven years before his official connection with the State Division of Fish and Game. It was incited by a recommendation of the San Joaquin County Game and Fish Protective Association that the game laws be changed to provide a uniform opening date for deer hunting in all districts of California. Moffitt well knew the differing lives led by the black-tailed deer of the coast counties and the mule deer of the Sierras and realized that differing opening dates for the hunting season were needed in the two areas.

From his eleventh year, according to his own statement (Condor, 28, 1926:241), Moffitt hunted ducks and geese on the Suisun marshes. He had noted differences in voice, flight, and feeding habits among the flocks of wintering geese which made him read with especial interest Swarth and Bryant's study of the races of White-fronted Geese occurring in California. Thus stimulated, his own interest in field characters became more acute and resulted in the appearance nine years later of his "Notes on White-fronted and Tule Geese in Central California" (*loc. cit.*). Here he confirms and amplifies the earlier field observations of Judge Henshaw and Sam Lamme on the differing habits of these two races.

The paper entitled "The White-cheeked Goose in California" (Condor, 39, 1937: 149-159) was the result of a desire to test the prediction made by Harry Swarth that if the White-cheeked Goose "occurs in this state at all it should be found along the extreme northern coast." To this area Moffitt made four trips, the first three while connected with the California Division of Fish and Game, the fourth, with Mrs. Moffitt, in the spring of 1937. The specimens obtained together with the information gained from old residents of the region confirmed Swarth's theory and added the race *occidentalis* to the forms of *Branta canadensis* known to winter in California. These and the other papers on geese which are listed among Moffitt's writings were preliminary notes to be followed by his exhaustive study of North American geese. Of the collection of skins which he amassed with the above study in view it has been said (Academy Newsletter, 44, August, 1943:3) "His personal collection of these important game birds now represents the finest of its type in western North America. Systematic and neat in his own ways he was meticulously careful in his preparation of material. No finer examples of the art of preparing bird skins are to be found in any museum."

When in 1931 he became associated with the State Division of Fish and Game, James Moffitt instituted an annual census of the numbers of Black Brant wintering on those California bays that support a growth of eel grass. February 11 and 12 were selected as the ideal dates for making these surveys. For twelve years Moffitt himself took charge of the work, aided by members of the Division and other interested institutions and individuals. The reports were each year compiled by him and published in California Fish and Game, as listed in the appended bibliography. These reports are evaluated by Brian Curtis, editor of "California Fish and Game," "as the most important long-range survey of bird populations in this part of the world."

Another project to which Moffitt gave much time and thought was a survey of the waterfowl breeding within the limits of California. One of his main objects in making this survey was to acquaint sportsmen and duck club owners with the State's possibilities as a duck breeding area. He felt that by the controlled use of water on shooting lands now allowed to dry out in summer the annual crop of resident species could be much increased. He believed that many sportsmen are unaware of the extent to which California served as a breeding ground in early days.

An analysis of the ecological factors controlling the seasonal abundance of water-

fowl on the Suisun marshes is given in "Environmental factors affecting waterfowl in the Suisun area, California" (Condor, 40, 1938:76-84). This paper is a carefully compiled record of the changes which took place in the marsh during the author's twenty-five year acquaintanceship with it, together with a wealth of detail which shows how these changes in the marsh have affected the numbers and habits of those species of wildfowl which frequent the region. The facts set forth are of value to the hunter, the student of game management, and to the ecologist, for James Moffitt's interest in wild life was not limited to one field—he was a sportsman, a conservationist, and a student deeply interested in the why of things.



Fig. 12. Autumn in Mendocino County.

Moffitt's interest in another group of game birds, the grouse, is evidenced by his paper on "Variation in *Dendragapus* in the Coast Range of California," read at one of the sessions of the fifteenth annual meeting of the Cooper Club; also by the study entitled "The downy young of *Dendragapus*" (Auk, 55, 1938:589-595), illustrated by Allan Brooks' color plate portraying downy chicks of two races of *obscurus* and four of *fuliginosus*.

Many trips were made to the arid plateau region of northeastern California in search of the apparently vanished Columbian Sharp-tailed Grouse and to study the Sage Grouse. None of the notes obtained on these trips has been published, save for the material on Sage Grouse which appears incidentally in "Apparatus for marking wild animals with colored dyes" (Jour. Wildlife Management, 6, 1942:312-318). The patience, perseverance and ingenuity shown in the construction and application of this apparatus illustrates one of James Moffitt's outstanding characteristics, his infinite resourcefulness.

One of Moffitt's contributions to the Gull (1939:62-64), "The California Coast between Fort Bragg and Capetown," was written to serve as a guide to nature lovers planning to drive through that seldom visited region of California, but whether or not one plans to travel that way, it merits reading for the beauty and accuracy of its descriptions of the scenery and wild life of the lovely and lonely roads of Mendocino County's rugged coast line.

Those of us who knew James Moffitt in the field and through his studies are content to believe that patience and thoroughness such as his always score in the long run. The

winnowing process of time will leave his contributions a permanent place in ornithological literature.

PUBLISHED WRITINGS OF JAMES MOFFITT

(Adapted from a bibliography published in the California Academy of Sciences News Letter, Number 44, August, 1943:5-7)

1926. Suggested dates of open season on deer in California. *Calif. Fish and Game*, 12:124-127, figs. 26-27.
Notes on the white-fronted and tule geese in central California. *Condor*, 28:241-243.
1931. The status of the Canada goose in California. *Calif. Fish and Game*, 17:20-26, figs. 13-16.
Diseases reducing tree squirrel population in southern California. *Calif. Fish and Game*, 17:338-339.
First annual black sea brant census in California. *Calif. Fish and Game*, 17:396-401, figs. 104-106.
Some protected birds the duck hunter should know. *Calif. Fish and Game*, 17:412-420, figs. 117-120.
Banding Canada geese in California in 1931. *Condor*, 33:229-237, figs. 54-57.
The status of the blue-winged teal in California. *Condor*, 33:247-248.
Red-breasted merganser in Orange County, California, in June. *Condor*, 33:252.
Wood ibis in Modoc County, California. *Condor*, 33:256.
1932. The downy young of some foreign species of ducks and geese. *Auk*, 49:214-215.
Clapper rails occur on marshes of Salton Sea, California. *Condor*, 34:137.
The Townsend solitaire in San Francisco. *Condor*, 34:190-191.
The Baikal teal taken in California. *Condor*, 34:193.
Second annual black brant census in California. *Calif. Fish and Game*, 18:298-310, figs. 72-78.
Recent researches into the migratory waterfowl problem on the Pacific Coast. Fifth Pacific Science Congress, pp. 4081-4085.
1933. Third annual black brant census in California. *Calif. Fish and Game*, 19:255-263, figs. 82-83.
Federal duck feeding survey. *Calif. Fish and Game*, 19:271-272.
Study of Pacific Coast deer. *Calif. Fish and Game*, 19:274.
Wild animal importation law. *Calif. Fish and Game*, 19:274-275.
Second state fair deer head exhibit. *Calif. Fish and Game*, 19:276-277.
[Review of] Leopold's "Game Management." *Calif. Fish and Game*, 19:280-281.
Food habits of coyotes. [A review of "Autumn food habits of coyotes, a report of progress, 1932" by Charles C. Sperry.] *Calif. Fish and Game*, 19:284-286.
1934. History of the Yosemite elk herd. *Calif. Fish and Game*, 20:37-51, figs. 7-15.
Mule deer study program. *Calif. Fish and Game*, 20:52-66, fig. 15.
New fish and game code. *Calif. Fish and Game*, 20:67-68.
Regulations governing importation of certain wild birds and animals. *Calif. Fish and Game*, 20:68.
Oregon adopts upland game bird land-owner contract law. *Calif. Fish and Game*, 20:77-78.
Waterfowl abundance in California in 1933. *Calif. Fish and Game*, 20:78-79.
Another "new" deer for California. *Calif. Fish and Game*, 20:81.
Death of buck deer result of fighting in rut. *Calif. Fish and Game*, 20:82-84, fig. 17.
Deer fencing law repealed. *Calif. Fish and Game*, 20:84.
Deer hunting success in Angeles National forest. *Calif. Fish and Game*, 20:84-85.
[Review of] Sheldon's deer of California. *Fish and Game*, 20:85-87.
[Review of] Grinnell's review of California mammal fauna. *Calif. Fish and Game*, 20:87-91.
Federal wild-life restoration program. *Calif. Fish and Game*, 20:163-166.
1933 deer kill statistics. *Calif. Fish and Game*, 20:166.
Deer herd winters well. *Calif. Fish and Game*, 20:166.
Revised estimate of 1933 California waterfowl abundance. *Calif. Fish and Game*, 20:167-168.
Addition to list of totally excluded animals—state importation law. *Calif. Fish and Game*, 20:168.
Funds for federal wild-life restoration program shrink. *Calif. Fish and Game*, 20:287.
In memory of F. W. Van Sicklen. *Calif. Fish and Game*, 20:288.
Early black-tailed deer breeding record. *Calif. Fish and Game*, 20:291.
Unusual age attained by wild geese. *Calif. Fish and Game*, 20:291-292, fig. 113.
Sand-grouse liberated in California. *Calif. Fish and Game*, 20:292-295, fig. 114.
Fourth annual black brant census in California. *Calif. Fish and Game*, 20:355-364, fig. 136.
Food habits of coyotes. [A review of "Autumn food habits of coyotes, a report of progress,

- 1932" by Charles C. Sperry.] *Outdoor Nebraska*, 9:5, 11. (Reprinted from *Calif. Fish and Game*, 19:284-286.)
1935. Fifth annual black brant census in California. *Calif. Fish and Game*, 21:343-350.
Waterfowl shooting losses indicated by banding returns* *Trans. 21st Amer. Game Conf.*, pp. 305-308.
1936. Sixth annual black brant census in California. *Calif. Fish and Game*, 22:295-300.
1937. The white-cheeked goose in California. *Condor*, 39:149-159, figs. 45-47.
Seventh annual black brant census in California. *Calif. Fish and Game*, 23:290-295.
1938. Environmental factors affecting waterfowl in the Suisun area, California. *Condor*, 40:76-84.
Two southern petrels in the north Pacific. *Auk*, 55:255-259.
The downy young of *Dendragapus*. *Auk*, 55:589-595, col. pl., frontispiece.
Notes on the distribution of loons and grebes in California. *Condor*, 40:261-262.
[with R. T. Orr.] Recent disastrous effects of oil pollution on birds in the San Francisco Bay region. *Calif. Fish and Game*, 24:239-244, figs. 84, 85.
Eighth annual black brant census in California. *Calif. Fish and Game*, 24:341-346.
1939. Notes on the distribution of sooty shearwater, white pelican, and cormorants in California. *Condor*, 41:32-33.
Notes on the distribution of herons in California. *Condor*, 41:81-82.
Notes on the distribution of whistling swan and Canada goose in California. *Condor*, 41:93-97, fig. 28.
Notes on the distribution of the lesser Canada goose and cackling goose in California. *Condor*, 41:164-166.
The California coast between Fort Bragg and Capetown. *Gull*, 21:62-64.
Ninth annual black brant census in California. *Calif. Fish and Game*, 25:336-342.
1940. The ring-necked duck in northern California. *Gull*, 22:13-15, 1 ill.
Clapper rail project. *Gull*, 22:45-46.
Third record of the king eider in California. *Condor*, 42:305.
An apparently authentic record of the spectacled eider for California. *Condor*, 42:309.
[National Audubon Society kite posters.] *Condor*, 42:310.
Tenth annual black brant census in California. *Calif. Fish and Game*, 26:381-389.
1941. Creepers and sequoias. *Condor*, 43:75-76.
[Review of R. T. Peterson's] A field guide to western birds. *Wilson Bulletin*, 53:203-204.
Notes on the food of the California clapper rail. *Condor*, 43:270-273.
Eleventh annual black brant census in California. *Calif. Fish and Game*, 27:216-233, figs. 59-63.
[with C. Cottam] Eelgrass depletion on the Pacific coast and its effect upon black brant. U. S. Dept. Interior, Fish and Wildlife Service, Leaflet 204. 26 pp.
1942. Apparatus for marking wild animals with colored dyes. *Jour. Wildlife Management*, 6:312-318, pl. 29.
A nesting colony of ring-billed gulls in California. *Condor*, 44:105-107.
1943. Twelfth annual black brant census in California. *Calif. Fish and Game*, 29:19-28.

Museum of Vertebrate Zoology, Berkeley, California, February 10, 1944.

CHECK-LIST OF THE BIRDS OF UTAH

By WILLIAM H. BEHLE

The first list of birds for the Utah area appeared in 1873 as part of the report of C. Hart Merriam on the results of the ornithological work of the Snake River division of the Hayden Survey of 1872. All of the birds then known to occur in Utah Territory were included, and they numbered 176 kinds. The list contained no annotations. Since the Territory of Utah at that time covered the same area as does the state of Utah, this list was in effect the first state list.

Dr. H. C. Yarrow and Henry W. Henshaw also worked in Utah in 1872 while attached as naturalists to the Wheeler Survey West of One Hundredth Meridian. Following this, Henshaw compiled an annotated list of the birds of the state, which was first presented before the Lyceum of Natural History of New York on April 6, 1874, and was published shortly thereafter in the annals of the society. It was printed again in the same year, with a few minor changes, as part of a government publication giving the results of the ornithological work of the Wheeler Surveys for the years 1871 to 1874. In this list 214 kinds of birds were included.

While there has been considerable advance in our knowledge of the avifauna of Utah since that time, no further list of the birds of the state seems to have appeared in print, although Clarence Cottam drew up a list in manuscript form which was presented as a thesis for the Master's degree at Brigham Young University in 1927, and A. M. Woodbury worked out a key to the birds of Utah which was mimeographed and used in class work at the University of Utah for several years starting in 1933.

A. M. Woodbury, Clarence Cottam and John W. Sugden have been engaged for many years in the preparation of a comprehensive book on the birds of Utah, but several more years seem likely to elapse before this work will be published. In the meantime need exists for an up-to-date list of the kinds of birds known to occur in the State together with an indication of the abundance, seasonal status, and general distribution of each. The writer has therefore prepared the present synopsis which will not interfere materially with the project of Woodbury, Cottam and Sugden, yet will serve as a working tool for those interested in the birds of the State.

This work is a summary of the published record interpreted in terms of present-day systematics. It is intended to serve as the "official" state list for a few years to come. With such a list available, additions (and deletions if necessary) can then be made without the uncertainty and confusion that now exists.

Every kind of bird listed here as part of the avifauna of Utah is based on at least one record in the literature. In most instances, a specimen substantiates the record, but a few sight records have been accepted where they seem reasonable and have been offered by competent observers. Unfortunately, it has not been possible for the writer to verify the identity of all the record specimens. However, in every accepted case the original information was presented by some well qualified ornithologist. In the few instances where the writer has rejected records in the literature, mention is made of the fact in appropriate places. Where but one or two records exist, they are cited; otherwise there are several records. The writer has had to exercise his own judgment with respect to the validity of certain proposed races and the distribution of many subspecies in the State.

In this list the order is essentially that of the Check-list of North American Birds of the American Ornithologists' Union (4th ed., 1931). In a few places the sequence

and nomenclature have been changed to conform with later usage among systematists, particularly that of Peters in the first four volumes of his *Birds of the World*. Complete classification has not been given in this check-list, but orders and families are indicated for the benefit of students concerned with the relationships and the characters of these natural groups.

For a resumé of the ornithological work done in Utah and also for a bibliography of publications on birds of this state, the reader is referred to the following articles: *Highlights of Ornithological Work in Utah* by Behle (*Condor*, 40, 1938:165-173); *The Birds of the Uinta Basin, Utah*, by Twomey (*Annals Carnegie Museum*, 28, 1942: 341-490) and *Birds of Pine Valley Mountain Region, Southwestern Utah*, by Behle (*Bull. Univ. Utah*, 33, 1943:1-85).

Publication of this list has been financed in part by a grant from the University of Utah Research Committee.

Order GAVIIFORMES. Loons.

Family GAVIIDAE. Loons.

Gavia immer elasson Bishop. Lesser Loon.

Uncommon as a winter visitant and transient. Has been recorded at various localities distributed over the State. Measurements of the few available specimens indicate the race *elasson*.

Gavia arctica pacifica (Lawrence). Pacific Loon.

One record. A dead bird was found near Beaver, October 18, 1940; reported by Hardy (*Wilson Bull.*, 53, 1941:125).

Order COLYMBIFORMES. Grebes.

Family COLYMBIDAE. Grebes.

Colymbus auritus Linnaeus. Horned Grebe.

Rare transient. Most of the early day collectors in Utah reported this species, and Allen (*Bull. Mus. Comp. Zool.*, 3, 1872:173) states that one specimen was taken. The species does not seem to have been reported in recent years.

Colymbus nigricollis californicus (Heermann). Eared Grebe.

Fairly common summer resident and transient, with statewide distribution. A few occasionally are found in winter.

Aechmophorus occidentalis (Lawrence). Western Grebe.

Fairly common summer resident, especially in northern Utah. Several records of migrants well distributed over the State. Occasionally known to winter in northern Utah.

Podilymbus podiceps podiceps (Linnaeus). Pied-billed Grebe.

Common summer resident and migrant; winters in small numbers.

Order PELECANIFORMES. Totipalmate Swimmers.

Family PELECANIDAE. Pelicans.

Pelecanus erythrorhynchos Gmelin. White Pelican.

Summer resident in region of Great Salt Lake, breeding on certain islands in the lake; transient elsewhere.

Pelecanus occidentalis californicus Ridgway. California Brown Pelican.

Accidental. One sight record by Woodbury (*Condor*, 39, 1937:225) near mouth of Jordan River on shore of Great Salt Lake, April 28, 1934.

Family PHALACROCORACIDAE. Cormorants.

Phalacrocorax auritus auritus (Lesson). Double-crested Cormorant.

Summer resident in central northern Utah. Colonies at Egg Island, Great Salt Lake, Bear River Refuge, and Cache Valley. Transient over much of the State.

Order CICONIIFORMES. Herons, Storks, Ibises, Flamingos, and Allies.

Family ARDEIDAE. Herons and Bitterns.

Ardea herodias treganzai Court. Treganza Great Blue Heron.

Fairly common summer resident and transient throughout the State. Winters in small numbers in northern Utah at times.

Casmerodius albus egretta (Gmelin). American Egret.

Uncommon transient throughout the State.

Leucophoyx thula thula (Molina). Snowy Egret.

This race reported by Twomey (Ann. Carnegie Mus., 28, 1942:369) as nesting in the Uinta Basin near Jensen (3 specimens, Carnegie Museum).

Leucophoyx thula brewsteri (Thayer and Bangs). Prewster Egret.

Common summer resident in central northern Utah. Allen (Bull. Mus. Comp. Zool., 3, 1872:172) lists *Ibis alba* with the comment: "Only a few seen. Said to be frequent in summer." No specimens were collected, and he probably had reference to the species *Leucophoyx thula*.

Butorides virescens anthonyi (Mearns). Anthony Green Heron.

Rare summer resident in Virgin River valley, southwestern Utah.

Nycticorax nycticorax hoactli (Gmelin). Black-crowned Night Heron.

Common summer resident over much of the State. Winters in small numbers in northern Utah.

Botaurus lentiginosus (Montagu). American Bittern.

Fairly common summer resident in northern portions of state; transient in southern Utah. Brodkorb (Occas. Papers Mus. Zool. Univ. Mich. No. 333, 1936:1-4) has described a western race, calling it *B. l. peeti* with the statement that Great Basin birds are not typical, being more or less intermediate toward the eastern form.

Ixobrychus exilis hesperis Dickey and van Rossem. Western Least Bittern.

A specimen collected at St. George on May 20, 1938, was reported by Hardy (Condor, 41, 1939:86).

Family CICONIIDAE. Storks and Wood Ibises.

Mycteria americana Linnaeus. Wood Ibis.

Casual. Several records throughout the years including three since 1930. Probably once nested in the State.

Family THRESKIORNITHIDAE. Ibises and Spoonbills.

Plegadis guarauna (Linnaeus). White-faced Glossy Ibis.

Fairly common summer resident in the Great Salt Lake region; transient elsewhere.

Ajaia ajaja (Linnaeus). Roseate Spoonbill.

Accidental. Barnes (Auk, 36, 1919:565) reported a flock of five occurring at Wendover on July 2, 1919. One specimen was collected from the flock and mounted but has since been lost.

Order ANSERIFORMES. Screamers, Swans, Geese and Ducks.

Family ANATIDAE. Swans, Geese and Ducks.

Subfamily CYGNETAE. Swans.

Cygnus columbianus (Ord). Whistling Swan.

Transient through the State and common winter visitant on Bear River marshes.

Cygnus buccinator Richardson. Trumpeter Swan.

Coale (Auk, 32, 1915:87) reported several birds, once in the New York Zoological Park, which came from Salt Lake City.

Subfamily ANSERINAE. Geese.

Branta canadensis canadensis (Linnaeus). Common Canada Goose.

Summer resident at Bear River marshes; transient elsewhere in the State. Cottam (Proc. Utah Acad. Sci., 6, 1929:10) has reported the Hutchins Goose (*Branta canadensis hutchinsii*) as a winter visitant and migrant in Utah County. However, no specimens have been reported as taken in Utah to my knowledge.

Branta bernicla nigricans (Lawrence). Black Brant.

An autumn sight record for Rush Lake, Iron County, is contained in the Wheeler Survey reports of Henshaw.

Anser albifrons albifrons (Scopoli). White-fronted Goose.

Uncommon transient. Three records from 1850 to 1940.

Chen hyperborea hyperborea (Pallas). Lesser Snow Goose.

Common transient; less common as a winter visitant.

Chen caerulescens (Linnaeus). Blue Goose.

One record for Bear River marshes, October 13, 1936; reported by Marshall (Condor, 39, 1937:128).

Subfamily ANATINAE. Surface-feeding Ducks.

Anas platyrhynchos platyrhynchos Linnaeus. Mallard.

Permanent resident; most numerous during migration.

Anas rubripes Brewster. Black Duck.

Sight record for Rush Lake, Iron County, in November of 1872, by Yarrow of the Wheeler

Survey, and listed in the various reports of that survey. Specimen collected, December 8, 1942, at Bear River marshes (Williams, et al., Condor, 45, 1943:159).

Anas acuta taitzihoa Vieillot. Pintail.

Summer resident in northern Utah. Common in migration throughout the State. Occasionally winters in small numbers.

Anas crecca carolinensis Gmelin. Green-winged Teal.

Summer resident. Most common in migration. Winters in southern part of the State.

Anas discors Linnaeus. Blue-winged Teal.

Uncommon summer resident. Reported as transient throughout the State.

Anas cyanoptera cyanoptera Vieillot. Cinnamon Teal.

Common summer resident and transient throughout the State.

Spatula clypeata (Linnaeus). Shoveller.

Common summer resident and transient throughout the State.

Chaulelasmus streperus (Linnaeus). Gadwall.

Fairly common summer resident. A few occasionally winter in the State.

Mareca americana (Gmelin). Baldpate.

Uncommon summer resident in northern Utah. Common in migration throughout State. Winters along the Virgin River.

Aix sponsa (Linnaeus). Wood Duck.

Reported to be common in the early days, now rare as a transient. No certain breeding records of native birds.

Subfamily NYROCINAE. Diving Ducks.

Nyroca americana (Eyton). Redhead.

Common summer resident in northern Utah. Occurs as a transient throughout the State.

Nyroca collaris (Donovan). Ring-necked Duck.

Uncommon transient.

Nyroca valisineria (Wilson). Canvas-back.

Fairly common late migrant throughout the State. Possibly breeds in small numbers in the Bear River marsh area.

Nyroca marila nearctica (Stejneger). Greater Scaup Duck.

Uncommon transient; possibly a rare winter visitant.

Nyroca affinis (Eyton). Lesser Scaup Duck.

Uncommon transient and probably a casual summer resident in northern Utah.

Bucephala clangula americana (Bonaparte). American Golden-eye.

Uncommon transient and occasional winter visitant.

Bucephala islandica (Gmelin). Barrow Golden-eye.

Rare transient and winter visitant.

Bucephala albeola (Linnaeus). Buffle-head.

Uncommon migrant and winter visitant.

Clangula hyemalis (Linnaeus). Old-squaw.

Rare transient and possibly winter visitant. Reported by Cottam, et al. (Great Basin Nat., 3, 1942:52).

Melanitta fusca deglandi (Bonaparte). White-winged Scoter.

Rare transient and winter visitant.

Subfamily ERISMATURINAE. Ruddy Ducks.

Oxyura jamaicensis rubida (Wilson). Ruddy Duck.

Common summer resident in northern Utah; transient elsewhere.

Subfamily MERGINAE. Mergansers.

Lophodytes cucullatus (Linnaeus). Hooded Merganser.

Uncommon transient and winter visitant.

Mergus merganser americanus Cassin. American Merganser.

Fairly common transient; possibly breeds in some localities.

Mergus serrator Linnaeus. Red-breasted Merganser.

Common transient and occasional winter visitant. Probably breeds in the State (see Bee and Hutchings, Great Basin Nat., 3, 1942:65).

Order FALCONIFORMES. Birds of Prey.

Family CATHARTIDAE. American Vultures.

Cathartes aura teter Friedmann. Western Turkey Vulture.

Common summer resident throughout the State. Possibly resident in southern Utah and seemingly more common there than in northern sections.

Gymnogyps californianus (Shaw). California Condor.

One seen near Beaver, November 25, 1872, by Henshaw (recorded in the various Wheeler Survey reports).

Family ACCIPITRIDAE. Kites, Hawks and Allies.

Subfamily ACCIPITRINAE. Bird Hawks.

Accipiter gentilis atricapillus (Wilson). Eastern Goshawk.

Uncommon resident in Utah, breeding in mountains and at times moving down into valleys in winter. Also transient in lowland valleys. All specimens examined by the writer represent the eastern race. It is doubtful that the western race occurs at all in Utah even as a transient or winter visitant.

Accipiter striatus velox (Wilson). Sharp-shinned Hawk.

Common resident throughout the State, increasing in numbers during migration.

Accipiter cooperii (Bonaparte). Cooper Hawk.

Fairly common summer resident throughout the State; may winter in southern Utah.

Subfamily BUTEONINAE. Buzzards and Eagles.

Buteo jamaicensis calurus Cassin. Western Red-tailed Hawk.

Common resident throughout the State ranging from lowlands to high mountains. Twomey (Ann. Carnegie Mus., 28, 1942:378) has reported the Fuertes Red-tailed Hawk (*B. j. fuertesi*) as occurring in the Uinta Basin along with the light phase of *calurus*. The Uinta Basin may be an area of intergradation between the two races, but I find it difficult to conceive of two geographic races occurring as breeding birds in the same locality.

Buteo lineatus (Gmelin). Red-shouldered Hawk.

One record, a specimen taken at Elgin, Utah, September 28, 1939 (Knowlton and Harmston, Auk, 60, 1943:589).

Buteo swainsoni Bonaparte. Swainson Hawk.

Common summer resident in valleys of the State.

Buteo lagopus s. johannis (Gmelin). American Rough-legged Hawk.

Winter visitant in valleys in northern and central part of the State.

Buteo regalis (G. R. Gray). Ferruginous Rough-legged Hawk.

Summer resident in valleys of northern portion of the State and permanent resident in southern Utah. Rather common.

Aquila chrysaetos canadensis (Linnaeus). Golden Eagle.

Uncommon resident throughout the State. Formerly common.

Haliaeetus leucocephalus leucocephalus (Linnaeus). Southern Bald Eagle.

Formerly resident and possibly still so in some areas. A winter influx into northern Utah suggests that the northern race *H. l. washingtoniensis* may winter there.

Subfamily CIRCINAE. Harriers.

Circus cyaneus hudsonius (Linnaeus). Marsh Hawk.

Common resident. Abundant locally throughout the State.

Subfamily PANDIONINAE. Ospreys.

Pandion haliaetus carolinensis (Gmelin). Osprey.

Uncommon transient and summer resident at a few high mountain lakes in the State.

Family FALCONIDAE. Falcons.

Falco mexicanus Schlegel. Prairie Falcon.

Fairly common summer resident throughout the State; possibly resident in southern Utah.

Falco peregrinus anatum Bonaparte. Duck Hawk.

Rare summer resident. Records scattered well over the State.

Falco columbarius bendirei Swann. Western Pigeon Hawk.

Rare transient and winter visitant. Twomey (Ann. Carnegie Mus., 28, 1942:383) noted pigeon hawks in the Uinta Basin during migration and refers them to *F. c. richardsoni*. No specimens were collected, however.

Falco sparverius sparverius Linnaeus. Eastern Sparrow Hawk.

Very common resident throughout the State from valleys to mountain meadows; abundant during migration.

Order GALLIFORMES. Gallinaceous Birds.

Family TETRAONIDAE. Grouse and Ptarmigans.

Dendragapus obscurus obscurus (Say). Dusky Grouse.

Uncommon resident in the mountains of the State.

Bonasa umbellus incanus Aldrich and Friedmann. Hoary Ruffed Grouse.

Uncommon resident in the mountains of the central and northern portions of the State.

Lagopus leucurus altipetens Osgood. Southern White-tailed Ptarmigan.

Reported by Twomey (Ann. Carnegie Mus., 28, 1942:385) as occurring in the Uinta Mountains, although no specimens substantiate the claims of local residents as to its occurrence.

Pedioecetes phasianellus columbianus (Ord). Columbian Sharp-tailed Grouse.

Resident locally in northern Utah in small numbers where the original grassland remains.

Centrocercus urophasianus (Bonaparte). Sage Hen.

Fairly numerous in the sage brush areas throughout the State, although reduced in numbers as compared with pioneer days.

Family PERDICIDAE. Partridges and Quails.

Perdix perdix perdix (Linnaeus). European Partridge.

Introduced in the St. George region and probably elsewhere in the State but seems not to have survived (Hardy and Higgins, Proc. Utah Acad. Sci., Arts, Letters, 17, 1940:98).

Colinus virginianus (Linnaeus). Bob-white.

Introduced as early as 1872 and several times since in various localities in northern Utah. It is uncertain what subspecies were introduced and the species seems not to have become permanently established in the State.

Lophortyx californica (Shaw). California Quail.

Introduced as early as 1872 and many times since. Now established as a resident in many counties in central and northern Utah. There is some uncertainty as to the subspecies represented.

Two or three subspecies are probably now present in the State.

Lophortyx gambelii gambelii Gambel. Gambel Quail.

Permanent resident in southern part of state in Washington, Kane and San Juan counties where it is fairly common. Also ranges north along Colorado River drainage as far as Moab in Grand County.

Family PHASIANIDAE. Pheasants.

Phasianus colchicus torquatus Gmelin. Ring-necked Pheasant.

Introduced in northern Utah about 1912 and many times subsequently over much of the State. Now a common resident.

Order GRUIFORMES. Cranes, Rails and Allies.

Family GRUIDAE. Cranes.

Grus canadensis tabida (Peters). Sandhill Crane.

Formerly a summer resident in northern Utah; now mostly transient in small numbers.

Family RALLIDAE. Rails, Gallinules and Coots.

Rallus limicola limicola Vieillot. Virginia Rail.

Summer resident in much of the State. Possibly winters to some extent, as suggested by one February record for St. George.

Porzana carolina (Linnaeus). Sora Rail.

Summer resident over much of the State. Probably winters along Virgin River.

The status of three kinds of rails in Utah is uncertain. Allen (Bull. Mus. Comp. Zool., 3, 1872: 172, 182) listed "(?) *Rallus crepitans*" for the Great Salt Lake valley with the statement, "Said to be common." Ridgway (Bull. Essex Inst., 5, 1873:172) states that Allen's "*crepitans*" "should be *R. elegans*." Henshaw (Ann. New York Lyc. Nat. Hist., 11, 1874:11) lists the King Rail and refers to Allen's record. Friedmann (U. S. Nat. Mus. Bull., 50, 1941:85) includes Allen's citation in the synonymy under the King Rail (*Rallus elegans elegans*). However, the King Rail has not actually been collected in Utah to my knowledge. Until Allen's record is substantiated I prefer not to recognize the King Rail as a member of the state's avifauna.

Ridgway (U. S. Geol. Expl. 40th Par., 4, Pt. 3, 1877:613) under the scientific name ? *Porzana jamaicensis* and the vernacular name Little Black Rail, describes seeing a small rail of black color at Parley's Park. Several were killed but unfortunately were not retrieved. This record was cited by Merriam (6th Ann. Rept. U. S. Geol. Surv. Terr., 1873:715) and Henshaw (Ann. New York Lyc. Nat. Hist., 11, 1874:11). Friedmann (U. S. Nat. Mus. Bull., 50, Pt. 9, 1941:179) includes Ridgway's references in the synonymy under the Yellow Rail (*Coturnicops n. noveboracensis*). However, Henshaw's and Merriam's references to Ridgway's record are placed by Friedmann in the synonymy under the Farallon Rail (*Laterallus jamaicensis coturniculus*). Possibly Ridgway's Parley's Park rail was the basis for the indication in the A. O. U. Check-list that the Yellow Rail is casual in Utah. Insofar as I am aware neither the Black Rail nor the Yellow Rail has actually been collected in Utah, so there

is no evidence either way as to the identity of the rails seen by Ridgway in Parley's Park. Until there is corroborative evidence in the form of specimens collected, neither the Yellow nor the Black Rail can be accepted for the Utah list.

Porphyryula martinica (Linnaeus). Purple Gallinule.

Accidental. A female was collected November 23, 1924, at Haynes Lake, Salt Lake County, 12 miles southwest of Salt Lake City by Sugden (Condor, 27, 1925:210).

Fulica americana americana Gmelin. American Coot.

Common summer resident and transient throughout the State. Probably winters in southern Utah.

Order CHARADRIIFORMES. Shore Birds, Gulls, Auks and Allies.

Family CHARADRIIDAE. Plovers, Turnstones, and Surf-Birds.

Squatarola squatarola (Linnaeus). Black-bellied Plover.

Uncommon transient throughout the State.

Pluvialis dominica (Müller). Golden Plover.

On the basis of sight records, Twomey (Ann. Carnegie Mus., 28, 1942:390) reported the American Golden Plover (*P. d. dominica*) to be a fairly common migrant along the Green River in the Uinta Basin. That the species occurs in the State is further shown by the finding of a decomposing specimen (partly eaten by some predator) on October 28, 1939, by C. W. Lock-
erbie, ¼ mile north of the New State gun club, Davis County, Utah. This "mummy" is now in the University of Utah Museum of Zoology.

Charadrius hiaticula semipalmatus Bonaparte. Semipalmated Plover.

One sight record. Twomey (Ann. Carnegie Mus., 28, 1942:390) states that this plover was not an uncommon migrant in early May and September in the Uinta Basin.

Charadrius alexandrinus nivosus (Cassin). Western Snowy Plover.

Summer resident in northern Utah and transient through the State.

Charadrius vociferus vociferus Linnaeus. Killdeer.

Fairly common summer resident throughout the State; some winter in southern Utah.

Family SCOLOPACIDAE. Woodcocks, Snipes, and Sandpipers.

Bartramia longicauda (Bechstein). Upland Plover.

Two records. Ridgway (U. S. Geol. Expl. 40th Par., 4, Pt. 3, 1877:611) found the species to be common in July at Kamas, and Stanford (Bull. Univ. Utah, 21, 1931:4) observed one on April 16, 1930, near Salina.

Numenius americanus occidentalis Woodhouse. Northern Curlew.

Rare transient. Oberholser (Auk, 35, 1918:195) lists a specimen from Fillmore, taken on November 19, 1872.

Numenius americanus americanus Bechstein. Long-billed Curlew.

Common summer resident in northern Utah; transient elsewhere in the State.

Limosa fedoa (Linnaeus). Marbled Godwit.

Uncommon transient. Probably formerly was a breeder in northern Utah.

Tringa flavipes (Gmelin). Lesser Yellow-legs.

Uncommon transient through the State.

Tringa melanoleuca (Gmelin). Greater Yellow-legs.

Fairly common transient, often lingering until December in northern Utah.

Tringa solitaria cinnamomea (Brewster). Western Solitary Sandpiper.

Uncommon transient.

Actitis macularia (Linnaeus). Spotted Sandpiper.

Common summer resident throughout the State and also transient.

Catoptrophorus semipalmatus inornatus (Brewster). Western Willet.

Common summer resident in northern Utah; transient elsewhere.

Limnodromus scolopaceus (Say). Long-billed Dowitcher.

Fairly common transient. Most of the dowitchers in Utah seem to be of this species. (See Rowan, Auk, 49, 1932:14 and Conover, Auk, 58, 1941:376 for reasons for considering this dowitcher a separate species.)

Limnodromus griseus hendersoni Rowan. Inland Dowitcher.

This species likewise is found in Utah, although apparently it is less common than the preceding. There is doubt, however, as to the subspecies. It seems more likely that the Utah birds would be of the inland form *hendersoni* than the eastern *griseus*. One skin in the University of Utah collection was identified as *hendersoni* by Dr. H. C. Oberholser in 1941. It may be that *griseus* also occurs in Utah. Johnson (Wilson Bull., 47, 1935:160) lists two females in winter plumage from Provo, taken September 30, 1932; as *L. g. griseus*.

Capella delicata (Ord). Wilson Snipe.

Summer resident of fairly common occurrence in suitable localities, small numbers remaining throughout the winter.

Crocethia alba (Pallas). Sanderling.

Uncommon transient.

Ereunetes mauri Cabanis. Western Sandpiper.

Common transient. Twomey (Ann. Carnegie Mus., 28, 1942:394) reported the Semipalmated Sandpiper as transient through the Uinta Basin but has since corrected the identification to *E. mauri* (Condor, 46, 1944:90).

Erolia minutilla (Vieillot). Least Sandpiper.

Fairly common transient.

Erolia bairdii (Coues). Baird Sandpiper.

Uncommon transient.

Erolia alpina sakhalina (Vieillot). Red-backed Sandpiper.

Uncommon transient.

Family RECURVOSTRIDAE. Avocets and Stilts.

Himantopus himantopus mexicanus (Müller). Black-necked Stilt.

Fairly common migrant through the State and summer resident in northern Utah.

Recurvirostra americana Gmelin. Avocet.

Common migrant and summer resident in northern Utah.

Family PHALAROPODIDAE. Phalaropes.

Phalaropus fulicarius (Linnaeus). Red Phalarope.

The only record is that of Hayward (Wilson Bull., 49, 1937:304) who mentions two specimens being taken at St. George, Washington County, Utah, October 14, 15, 1934.

Steganopus tricolor Vieillot. Wilson Phalarope.

Common summer resident; even more numerous during migration.

Lobipes lobatus (Linnaeus). Northern Phalarope.

Fairly common transient.

Family STERCORARIIDAE. Jaegers and Skuas.

Stercorarius longicaudus Vieillot. Long-tailed Jaeger.

Accidental. One record by Fisher (Auk, 54, 1937:389) who reported one seen at the Bear River marshes on October 3, 1926.

Family LARIDAE. Gulls and Terns.

Subfamily LARINAE. Gulls.

Larus delawarensis Ord. Ring-billed Gull.

Fairly common winter visitant in northern Utah. Transient elsewhere in the State.

Larus argentatus smithsonianus Coues. Herring Gull.

Casual as a winter visitant and transient. Several records of late years for northern Utah.

Larus californicus Lawrence. California Gull.

Common summer resident in northern Utah, breeding on Rock Island, Utah Lake, several islands in Great Salt Lake, Farmington Bay, and Bear River marshes. Transient elsewhere in the State.

Larus hyperboreus Gunnerus. Glaucous Gull.

One record based on a specimen from Utah Lake, March 3, 1934, reported first by Johnson (Wilson Bull., 47, 1935:160).

Larus pipixcan Wagler. Franklin Gull.

Uncommon summer resident in northern Utah, one colony having been reported nesting at Bear River marshes. Transient over the State.

Larus philadelphia (Ord). Bonaparte Gull.

Infrequent transient. Collected by Allen (Bull. Mus. Comp. Zool., 3, 1872:173) near Ogden on October 1, 1871. Specimens have been collected at Utah Lake on May 13, 1933, and October 21, 1934, as reported by Beck (Great Basin Nat., 3, 1942:54).

Xema sabini (Sabine). Sabine Gull.

One record—a specimen taken by Allen (Bull. Mus. Comp. Zool., 3, 1872:173) on September 28, 1871, at Ogden.

Chlidonias nigra surinamensis (Gmelin). Black Tern.

Uncommon transient over the State; breeds in small numbers in northern Utah.

Hydroprogne tschegrava tschegrava (Lepechin). Caspian Tern.

Summer resident in northern Utah. Formerly nested at Great Salt Lake; now one colony at Utah Lake, and one at the Bear River marshes.

Sterna hirundo hirundo Linnaeus. Common Tern.

Uncommon transient. Specimen collected on September 14, 1941, at the Bear River Refuge; reported by Williams (Auk, 59, 1942:578).

Sterna forsteri Nuttall. Forster Tern.

Fairly common summer resident in northern Utah.

Order COLUMBIFORMES. Pigeon-like Birds.

Family COLUMBIDAE. Pigeons and Doves.

Columba fasciata fasciata Say. Band-tailed Pigeon.

Uncommon summer resident in the mountains of southern Utah; casual elsewhere in the State.

Zenaidura macroura marginella (Woodhouse). Western Mourning Dove.

Common summer resident throughout the State; at times stays through winter.

Order CUCULIFORMES. Cuckoo-like Birds.

Family CUCULIDAE. Cuckoos and Road-runners.

Coccyzus americanus occidentalis Ridgway. California Cuckoo.

Uncommon summer resident in the State.

Geococcyx californiana (Lesson). Road-runner.

Fairly common resident in the Virgin River valley of southwestern Utah.

Order STRIGIFORMES. Owls.

Family TYTONIDAE. Barn Owls.

Tyto alba pratincola (Bonaparte). Barn Owl.

Of uncommon occurrence. Known to nest in the southern part of the State.

Family STRIGIDAE. Typical Owls.

Otus flammeolus flammeolus (Kaup). Flammulated Screech Owl.

Uncommon resident in forested areas of the State.

Otus asio inyoensis Grinnell. Inyo Screech Owl.

Permanent resident in northwestern part of the State. Specimens from northeastern Utah may represent the race *O. a. maxwelliae*.

Otus asio cineraceus (Ridgway). Mexican Screech Owl.

Fairly common resident in central and southern Utah. Oberholser (Jour. Wash. Acad. Sci., 27, 1937:356) considers that the screech owls of central and southern Utah belong to a race that he named *mychophilus*.

Bubo virginianus lagophonus (Oberholser). Northwestern Horned Owl.

One record based on a specimen collected near St. George on October 22, 1933; reported by Hayward (Wilson Bull., 49, 1937:305).

Bubo virginianus occidentalis Stone. Montana Horned Owl.

Fairly common resident in northern and central portions of the State.

Bubo virginianus pallascens Stone. Western Horned Owl.

Resident in southwestern Utah along Virgin River drainage and probably in southeastern Utah in Colorado River area. Intergradation with *occidentalis* occurs over an extensive area farther north.

Nyctea scandiaca (Linnaeus). Snowy Owl.

One record. A specimen was collected near Provo in December, 1908 (Hayward, Wilson Bull., 47, 1935:284).

Glaucidium gnoma pinicola Nelson. Rocky Mountain Pygmy Owl.

Uncommon resident in coniferous forests of the State.

Speotyto cunicularia hypugaea (Bonaparte). Western Burrowing Owl.

Resident in valleys and plains throughout the State. Common only in some localities.

Strix occidentalis lucida (Nelson). Mexican Spotted Owl.

One record, an immature male taken at Navajo Mountain, San Juan County, August 13, 1936 (Woodbury, Condor, 41, 1939:158).

Asio otus wilsonianus (Lesson). Long-eared Owl.

Common resident in cottonwoods of lower valleys ranging up to the piñon-juniper belt.

Asio flammeus flammeus (Pontoppidan). Short-eared Owl.

Uncommon resident around marsh areas of lower valleys. Several records scattered about the State.

Aegolius acadicus acadicus (Gmelin). Saw-whet Owl.

Rare resident in the mountainous portions of the State.

Order CAPRIMULGIFORMES. Goatsuckers and Allies.

Family CAPRIMULGIDAE. Poor-wills and Nighthawks.

Chordeiles acutipennis texensis Lawrence. Texas Nighthawk.

Summer resident in the Virgin River valley, Washington County, southwestern Utah.

Chordeiles minor hesperis Grinnell. Pacific Nighthawk.

Summer resident in northwestern and central western Utah, that is, in Great Basin portion of the State.

Chordeiles minor sennetti Coues. Sennett Nighthawk.

Uncommon transient. A female taken by Hayward (Great Basin Nat., 1, 1940:94) near Provo, August 29, 1931, and another specimen by Twomey (Ann. Carnegie Mus., 28, 1942:402) 2 miles south of Jensen, September 21, 1937.

Chordeiles minor howelli Oberholser. Howell Nighthawk.

Summer resident in Uinta Basin of northeastern Utah; transient elsewhere in the State.

Chordeiles minor henryi Cassin. Western Nighthawk.

Summer resident in southeastern Utah. A non-breeding specimen has been reported by Twomey (Ann. Carnegie Mus., 28, 1942:402) for the Uinta Basin.

Phalaenoptilus nuttallii nuttallii (Audubon). Nuttall Poor-will.

Fairly common summer resident in lower valleys and foothills of the State.

Order MICROPODIFORMES. Swifts and Hummingbirds.

Family MICROPODIDAE. Swifts.

Aëronautus saxatalis saxatalis (Woodhouse). Western White-throated Swift.White-throated Swifts occur throughout the entire State in summer, being abundant locally where cliffs occur. Possibly there are two races represented, for Twomey (Ann. Carnegie Mus., 28, 1942:403) assigns his series from the Uinta Basin to the race *sclateri* (Rogers, Auk, 56, 1939:465).

Family TROCHILIDAE. Hummingbirds.

Archilochus alexandri (Bourcier and Mulsant). Black-chinned Hummingbird.

Fairly common summer resident in lower valleys of the State, occasionally occurring in mountains.

Calypte costae (Bourcier). Costa Hummingbird.

Uncommon summer resident in Washington County, southwestern Utah.

Selasphorus platycercus platycercus (Swainson). Broad-tailed Hummingbird.

Statewide distribution as a summer resident ranging from valleys to high mountains. Abundant.

Selasphorus rufus (Gmelin). Rufous Hummingbird.

Fairly common transient, especially in late July.

Stellula calliope (Gould). Calliope Hummingbird.

Uncommon summer resident of mountains.

Order CORACIIFORMES. Kingfishers.

Family ALCEDINIDAE. Kingfishers.

Megasceryle alcyon caurina (Grinnell). Western Belted Kingfisher.Fairly common summer resident along streams and rivers throughout the State. Twomey (Ann. Carnegie Mus., 28, 1942:406) assigns the kingfishers of the Uinta Basin of northeastern Utah to the eastern race *M. a. alcyon* on the basis of a single specimen taken 5 miles south of Heber.

Order PICIFORMES. Woodpeckers and Allies.

Family PICIDAE. Woodpeckers.

Colaptes auratus Linnaeus. Yellow-shafted Flicker.Grater (Condor, 45, 1943:76) reports a Yellow-shafted Flicker from Rockville, near Zion National Park. This may have been a hybrid with *Colaptes cafer*. Unfortunately, the bird was not secured.*Colaptes cafer collaris* Vigors. Red-shafted Flicker.Abundant resident throughout State. The race *canescens* described by Brodkorb (Occas. Papers Mus. Zool. Univ. Mich. No. 314, 1935:3) from southern Idaho is not accepted by many systematists (see van Rossem, Condor, 38, 1936:40).*Melanerpes erythrocephalus caurinus* Brodkorb. Western Red-headed Woodpecker.

Casual in Utah. Several records for northern Utah extend from 1869 to 1941.

Asyndesmus lewis Gray. Lewis Woodpecker.

Common summer resident in valleys and foothills of northern Utah; transient throughout State.

Sphyrapicus varius nuchalis Baird. Red-naped Sapsucker.

Fairly common summer resident in mountains.

Sphyrapicus thyroideus nataliae (Malherbe). Natalie Sapsucker.

Fairly common summer resident in mountains.

Dryobates villosus monticola Anthony. Rocky Mountain Hairy Woodpecker.

Common resident in mountains of central and northern portions of the State.

Dryobates villosus leucothorectis Oberholser. White-breasted Hairy Woodpecker.

Resident in mountains of southern Utah from Beaver and Wayne counties south into Arizona.

Dryobates pubescens leucurus (Hartlaub). Rocky Mountain Downy Woodpecker.

Common resident throughout the State. Breeds in lower portions of mountains. Winters in wooded regions of valleys.

Dryobates scalaris yumanensis van Rossem. Yuma Ladder-backed Woodpecker.

Fairly common resident in Joshua tree belt on west slope of Beaver Dam Mountains and in cottonwoods of the stream courses as far east as St. George, Washington County, southwestern Utah.

Picoides tridactylus dorsalis Baird. Alpine Three-toed Woodpecker.

Uncommon resident in high mountains of the State.

Order PASSERIFORMES. Perching Birds.

Family TYRANNIDAE. Tyrant Flycatchers.

Tyrannus tyrannus (Linnaeus). Eastern Kingbird.

Uncommon summer resident in valleys of northern Utah, at least. Oberholser's proposed western race *hespericola* (Sci. Publ. Cleveland Mus., 4, 1932:3) does not seem to be well differentiated (see Miller, Condor, 43, 1941:206).

Tyrannus verticalis Say. Arkansas Kingbird.

Statewide summer resident in valleys. Abundant.

Tyrannus vociferans Swainson. Cassin Kingbird.

Fairly common summer resident in southern part of the State from Virgin River valley east to Colorado River drainage of San Juan County.

Myiarchus cinerascens cinerascens (Lawrence). Ash-throated Flycatcher.

Common summer resident; distributed widely over lower section of the State but seemingly most abundant in southern Utah.

Sayornis nigricans semiatra (Vigors). Northern Black Phoebe.

Rare resident in Virgin River valley of southwestern Utah.

Sayornis saya Bonaparte. Say Phoebe.

Common in summer in lowland valleys. Occasionally seen also in winter.

Empidonax traillii brewsteri Oberholser. Little Flycatcher.

Fairly common summer resident in willow patches along valley streams. Twomey (Ann. Carnegie Mus., 28, 1942:412) suggests that the birds of the Uinta Basin approach the race *adastus* (Oberholser, Sci. Publ. Cleveland Mus. Nat. Hist., 4, 1932:3) but there seems to be some doubt as to the validity of this proposed race (see Miller, Condor, 43, 1941:259).

Empidonax hammondi (Xantus). Hammond Flycatcher.

Uncommon summer resident in spruce-fir forests of the State.

Empidonax wrightii Baird. Wright Flycatcher.

Common summer resident in mountains of the State. Found mostly in aspen areas.

Empidonax griseus Brewster. Gray Flycatcher.

Fairly common summer resident; more or less confined to the piñon-juniper pigmy forest. Thus common in southern portion of the State; rare to northward.

Empidonax difficilis difficilis Baird. Western Flycatcher.

Uncommon summer resident in mountains, often around cabins.

Myiochanes richardsonii richardsonii (Swainson). Western Wood Pewee.

Common summer resident of wide distribution in mountains of the State.

Nuttallornis borealis borealis (Swainson). Olive-sided Flycatcher.

Fairly common summer resident in high mountains.

Pyrocephalus rubinus mexicanus Slater. Vermilion Flycatcher.

Uncommon summer resident of southern Utah in Virgin River valley and at Kanab; occasionally remains through winter.

Family ALAUDIDAE. Larks.

Otocoris alpestris arcticola Oberholser. Pallid Horned Lark.

One record. A specimen taken near Salt Lake City, March 18, 1850, on the Stansbury Expedition; reported by Baird (Stansbury Report, 1852:312).

Otocoris alpestris hoyti Bishop. Hoyt Horned Lark.

Baird (Simpson Report, 1876:379) reported five Horned Larks taken at Camp Floyd (Fairfield, Utah) by Charles McCarthy, taxidermist with the Simpson Command of Johnston's Army. One of these (now in the U. S. National Museum) examined by the writer is *hoyti*. It was taken March 12, 1859.

Otocoris alpestris leucolaema (Coues). Desert Horned Lark.

Winter visitant throughout the State. Breeds in Uinta Basin in northeastern Utah.

Otocoris alpestris merrilli Dwight. Dusky Horned Lark.

Rare winter visitant.

Otocoris alpestris utahensis Behle. Great Salt Lake Horned Lark.

Permanent resident in western Utah in Great Basin section.

Otocoris alpestris occidentalis McCall. Montezuma Horned Lark.

Permanent resident in extreme southeastern Utah in San Juan County.

Family HIRUNDINIDAE. Swallows.

Tachycineta thalassina lepida Mearns. Violet-green Swallow.

Common summer resident, from lowland valleys up to mountain ridges.

Iridoprocne bicolor (Vieillot). Tree Swallow.

Fairly common summer resident and transient, from the valleys up to mountain aspen groves.

Riparia riparia riparia (Linnaeus). Bank Swallow.

Summer resident, but only abundant locally. Common in migration.

Stelgidopteryx ruficollis serripennis (Audubon). Rough-winged Swallow.

Fairly common summer resident and transient. Twomey (Ann. Carnegie Mus., 28, 1942:416) refers the birds of the Uinta Basin to the race *aphractus* (Oberholser, Sci. Publ. Cleveland Mus. Nat. Hist., 4, 1932:5). Wetmore (Proc. U. S. Nat. Mus., 86, 1939:202), Miller (Condor, 43, 1941:259) and Brodkorb (Condor, 44, 1942:214) do not recognize the race *aphractus*.

Hirundo rustica erythrogaster Boddaert. Barn Swallow.

Common summer resident and transient in valleys; often localized at bridges along streams.

Petrochelidon albifrons hypopolia Oberholser. Western Cliff Swallow.

Summer resident, common locally throughout the State, from valleys to mountains. For a systematic discussion involving the proposed race *aprophata*, see Miller (Condor, 43, 1941:261). Twomey (Ann. Carnegie Mus., 28, 1942:417) lists his birds from the Uinta Basin as *P. a. albifrons*, thus suggesting that the cliff swallows of the eastern part of the State may be different from those of the Great Basin portion.

Progne subis subis (Linnaeus). Purple Martin.

Uncommon summer resident in mountains of northern Utah.

Family CORVIDAE. Jays, Magpies and Crows.

Perisoreus canadensis capitalis Ridgway. Rocky Mountain Jay.

Resident in mountains of central and northern Utah. Fairly common in suitable habitat.

Cyanocitta stelleri annexens (Baird). Black-headed Steller Jay.

Common summer resident, possibly a permanent resident, in northern Utah; tends to drift southward in winter.

Cyanocitta stelleri diademata (Bonaparte). Long-crested Steller Jay.

Permanent resident in southern and eastern Utah, seemingly intergrading with *annexens* over a vast area in central Utah.

Cyanocitta stelleri percontatrix van Rossem. Pallid Steller Jay.

Permanent resident in Pine Valley Mountains of southwestern Utah. For a discussion of the distribution and variation of the Steller jays of Utah see Behle (Bull. Univ. Utah, 33, 1943:48). The name *cottami* (Oberholser, Proc. Biol. Soc. Wash., 50, 1937:117) is regarded as having been applied to an intergrading population between *annexens* and *diademata*.

Aphelocoma californica woodhousei (Baird). Woodhouse Jay.

Permanent resident of common occurrence in foothills and valleys in practically all sections of the State.

Pica pica hudsonia (Sabine). American Magpie.

Permanent resident in valleys. Common in central and northern Utah.

Corvus corax sinuatus Wagler. American Raven.

Fairly common resident in desert regions, especially in western Utah.

Corvus brachyrhynchos hesperis Ridgway. Western Crow.

Uncommon permanent resident in valleys.

Cyanocephalus cyanocephalus (Wied). Piñon Jay.

Fairly common resident in the piñon-juniper belt of the State. Brodkorb (Occas. Papers Mus.

Zool., Univ. Mich. No. 332, 1936) advocates using the name *Gymnorhinus cyanocephalus cassini* (McCall) for a western race which if accepted will include the birds of Utah, in part at least.

Nucifraga columbiana (Wilson). Clark Nutcracker.

Fairly common summer resident in mountains of the State.

Family PARIDAE. Titmice, Verdins, and Bush-tits.

Parus atricapillus nevadensis (Linsdale). Nevada Black-capped Chickadee.

Summer resident in northern and eastern parts of State. Fairly common, ranging from lower canyons to mountain areas.

Parus gambeli gambeli Ridgway. Mountain Chickadee.

Permanent resident in mountains of Utah except those in the western and southwestern portions of the State.

Parus gambeli inyoensis (Grinnell). Inyo Chickadee.

Permanent resident in Pine Valley Mountains of southwestern Utah (Behle, Bull. Univ. Utah, 33, 1943:52). Probably represented also in mountains of western desert region of Utah.

Parus inornatus ridgwayi Richmond. Gray Titmouse.

Permanent resident throughout the State in the piñon-juniper belt.

Auriparus flaviceps acaciarius Grinnell. Arizona Verdin.

Breeds in extreme southwestern Washington County; probably permanently resident there. Uncommon.

Psaltiriparus minimus plumbeus (Baird). Lead-colored Bush-tit.

Fairly common permanent resident over most of the State; more common in southern portion. Occurs chiefly in piñon-juniper belt.

Family SITTIDAE. Nuthatches.

Sitta carolinensis nelsoni Mearns. Rocky Mountain Nuthatch.

Fairly common permanent resident in mountains. Stanford (Proc. Utah Acad. Sci., Arts, Letters, 15, 1938:140) reports a specimen taken June 29, 1935, at Providence Canyon, Cache County, as *S. c. tenuissima* and Twomey (Ann. Carnegie Mus., 28, 1942:422) has described a new race from the Uinta Basin, *S. c. uintaensis*. Until considerably more comparative material is available from all parts of Utah to demonstrate without doubt the presence of these two additional races in the State, the writer prefers to list only one race for Utah, namely *nelsoni*.

Sitta canadensis canadensis Linnaeus. Red-breasted Nuthatch.

Fairly common resident and transient in mountains.

Sitta pygmaea melanotis van Rossem. Black-eared Pigmy Nuthatch.

Common permanent resident in mountains of the State. Hardy (Wilson Bull., 53, 1941:236) reports the race *S. p. canescens* occurring in the Pine Valley Mountains of southwestern Utah. Behle (Bull. Univ. Utah, 33, 1943:54) reports typical *melanotis* there. Clarification of this problem awaits the accumulation of a large series of breeding birds from the area.

Family CETHIIDAE. Creepers.

Certhia familiaris montana Ridgway. Rocky Mountain Creeper.

Fairly common summer resident in mountains, drifting down to wooded portions of valleys in winter.

Family CINCLIDAE. Dippers.

Cinclus mexicanus unicolor Bonaparte. Dipper.

Common resident along mountain streams throughout the State.

Family TROGLODYTIDAE. Wrens.

Troglodytes aedon parkmanii Audubon. Western House Wren.

Fairly common summer resident in mountains. Probably winters to some extent in southern Utah in valleys.

Nannus hiemalis pacificus (Baird). Western Winter Wren.

Uncommon winter visitant. Records thus far seem to center in Virgin River valley of southwestern Utah.

Thryomanes bewickii eremophilus Oberholser. Desert Bewick Wren.

Common resident in lowland areas of southern Utah; rare farther north.

Heleodytes brunneicapillus couesi (Sharpe). Northern Cactus Wren.

Fairly common breeding species in Washington County, southwestern Utah.

Cistothorus palustris plesius Oberholser. Western Marsh Wren.

Common resident in lowland marshes. Seems to be more abundant in summer.

The Short-billed Marsh Wren (*Cistothorus stellaris*) has been attributed to Utah, based on Hen-

shaw's record of the Wheeler Survey. However, Henshaw did not obtain specimens and based his identity on nests and eggs which were probably aberrant representatives of the long-billed species. There appears to be no substantiation of the occurrence of the species in the State.

Catherpes mexicanus conspersus Ridgway. Cañon Wren.

Fairly common resident in canyons and cliff areas of southern Utah; rare in northern part of the State.

Salpinctes obsoletus obsoletus (Say). Rock Wren.

Abundant summer resident in southern Utah, remaining through winter in smaller numbers; less frequent in northern Utah. Occurs from valleys up into mountains, wherever rocky areas and talus slopes occur.

Family MIMIDAE. Mockingbirds and Thrashers.

Mimus polyglottos leucopterus (Vigors). Western Mockingbird.

Statewide resident in summer in valleys, being exceedingly abundant in the Virgin River valley of southwestern Utah. Permanently resident in southern Utah, at least.

Dumetella carolinensis (Linnaeus). Catbird.

Fairly common summer resident in thickets in valleys of northern part of the State; seemingly uncommon elsewhere.

Toxostoma rufum (Linnaeus). Brown Thrasher.

One record for Zion National Park, where a specimen was collected December 9, 1935, by Grantham (Condor, 38, 1936:85).

Toxostoma bendirei (Coues). Bendire Thrasher.

Probably of regular occurrence in San Juan area of southeastern Utah. Woodbury (Condor, 41, 1939:159) reports specimens from 10 miles southeast of Escalante and from Monument Valley. An odd record is that of Bee and Hutchings (Great Basin Nat., 3, 1942:78) who report a nest and eggs from the shore of Utah Lake, south of Lehi, April 26, 1932.

Toxostoma lecontei lecontei Lawrence. Leconte Thrasher.

Rare in mesquite areas of extreme southwestern Utah in Washington County. Probably resident.

Toxostoma dorsale dorsale Henry. Crissal Thrasher.

Uncommon resident in Lower Sonoran Zone of Washington County, southwestern Utah.

Oreoscoptes montanus (Townsend). Sage Thrasher.

Common summer resident throughout the State in desert sage-brush valleys.

Family TURDIDAE. Thrushes, Bluebirds and Solitaires.

Turdus migratorius propinquus Ridgway. Western Robin.

Abundant summer resident throughout the State from valleys up into mountains. Winters in lowlands in small numbers.

Hylocichla guttata guttata (Pallas). Alaska Hermit Thrush.

Uncommon transient, possibly wintering in southern part of the State.

Hylocichla guttata nanus (Audubon). Dwarf Hermit Thrush.

Presnall (Proc. Utah Acad. Sci., Arts, Letters, 12, 1935:205) reports taking a transient of this race at Zion National Park. Presumably it was identified at the Museum of Vertebrate Zoology or by Dr. H. C. Oberholser and is a valid record.

Hylocichla guttata auduboni (Baird). Audubon Hermit Thrush.

Common summer resident in coniferous forests of mountains. Study of specimens collected by the writer in southwestern Utah indicate no approach to the race *polionota* as suggested by the McCabes (Condor, 34, 1932:32). Twomey (Ann. Carnegie Mus., 28, 1942:430) lists one transient from the Uinta Basin as *H. g. oromela*, a race described by Oberholser (Sci. Publ. Cleveland Mus. Nat. Hist., 4, 1932:8) but Miller (Condor, 43, 1941:262) doubts the existence of the race *oromela*. Nevertheless, the race *polionota* probably occurs in Utah as a transient.

Hylocichla ustulata almae Oberholser. Rocky Mountain Olive-backed Thrush.

Uncommon summer resident in willows of mountain parks and clearings. Twomey (Ann. Carnegie Mus., 28, 1942:431) uses the name *H. u. swainsoni* for his Uinta specimen. It is doubtful that more than one race is represented in Utah.

Hylocichla fuscescens salicicola Ridgway. Willow Thrush.

Uncommon summer resident of northern Utah, occurring in streamside thickets in lower portions of canyons.

Sialia mexicana bairdi Ridgway. Chestnut-backed Bluebird.

Fairly common summer resident in yellow pines of southern mountainous areas.

Sialia mexicana occidentalis Townsend. Western Bluebird.

Uncommon transient (Behle, Wilson Bull., 53, 1941:183).

Sialia currucoides (Bechstein). Mountain Bluebird.

Common summer resident in valleys and along benches of lowlands; uncommon in high mountain meadows. Occurs sparingly in winter.

Myadestes townsendi (Audubon). Townsend Solitaire.

Common summer resident in mountains, at times wintering in valleys.

Family SYLVIIDAE. Gnatcatchers and Kinglets.

Poliotila caerulea amoenissima Grinnell. Western Gnatcatcher.

Common summer resident in piñon-juniper belt; especially abundant in southern Utah.

Regulus regulus olivaceus Baird. Western Golden-crowned Kinglet.

Fairly common summer resident in coniferous forests of mountains.

Regulus calendula cineraceus Grinnell. Western Ruby-crowned Kinglet.

Common summer resident throughout the State occurring in coniferous forests. A few winter in lowlands, especially in southern Utah.

Family MOTACILLIDAE. Wagtails and Pipits.

Anthus rubescens rubescens (Tunstall). Eastern Pipit.

Fairly common as a transient through the State and winter visitant in southern Utah, at least.

Anthus rubescens alticola Todd. Rocky Mountain Pipit.

Summer resident in high Uinta Mountains. Transient elsewhere. Possibly winters in southern Utah.

Family BOMBYCILLIDAE. Waxwings.

Bombycilla garrula pallidiceps Reichenow. Bohemian Waxwing.

Winter visitant. Common in northern Utah, in some winters at least; less common in southern part of State.

Bombycilla cedrorum Vieillot. Cedar Waxwing.

Uncommon summer resident in valleys and lower mountain areas of northern section. Winters in small numbers with Bohemian Waxwings.

Family PTILOGONATIDAE. Silky Flycatchers.

Phainopepla nitens lepida Van Tyne. Northern Phainopepla.

Fairly common summer resident in Lower Sonoran Zone of Washington County, southwestern Utah.

Family LANIIDAE. Shrikes.

Lanius excubitor invictus Grinnell. Northwestern Shrike.

Uncommon winter visitant in the valleys throughout the State.

Lanius ludovicianus excubitorides Swainson. White-rumped Shrike.

Summer resident in the Uinta Basin of northeastern Utah. Twomey (Ann. Carnegie Mus., 28, 1942:435) lists his birds under this subspecies, indicating that they are intergrades between *excubitorides* and *nevadensis*, a circumstance previously noted by Miller (Univ. Calif. Publ. Zool., 38, 1931:75).

Lanius ludovicianus nevadensis Miller. Great Basin Shrike.

Summer resident, or even permanent resident, throughout the State except in northeastern section where intergradation occurs with *excubitorides*.

Lanius ludovicianus gambeli Ridgway. California Shrike.

Transient through the State and a winter visitant in St. George area of southwestern Utah.

Family STURNIDAE. Starlings.

Sturnus vulgaris vulgaris Linnaeus. Starling.

Thus far known only as a winter visitant in northern Utah (Lockerbie, Condor, 41, 1939:170) and as a transient through southern Utah (Grafer, Condor, 44, 1942:41).

Family VIREONIDAE. Vireos.

Vireo bellii arizonae Ridgway. Arizona Vireo.

Two specimens taken on April 19, 20, 1940, near St. George (Hardy, Wilson Bull., 53, 1941:125).

Vireo vicinior Coues. Gray Vireo.

Fairly common summer resident in southwestern Utah ranging up to piñon-juniper belt.

Vireo solitarius plumbeus Coues. Plumbeous Vireo.

Reported from various localities over the State but seemingly uncommon. Summer resident in Transition Zone.

Vireo solitarius cassinii Xantus. Cassin Vireo.

Uncommon transient.

Vireo olivaceus (Linnaeus). Red-eyed Vireo.

Uncommon transient.

Vireo gilvus leucopolius Oberholser. Oregon Warbling Vireo.

The warbling vireo is a common summer resident well distributed over the State and occurring in cottonwoods and aspens of mountains. Those of the western portion of the State appear to represent the race *leucopolius* (Oberholser, Sci. Publ. Cleveland Mus. Nat. Hist., 4, 1932:9). It may be that the population of the eastern part of the State represents another race. Twomey (Ann. Carnegie Mus., 28, 1942:437) lists his birds under *V. g. swainsoni* but without systematic discussion.

Family COMPSOTHELYPIDAE. Wood Warblers.

Vermivora celata celata (Say). Northern Orange-crowned Warbler.

Uncommon transient.

Vermivora celata orestera Oberholser. Rocky Mountain Orange-crowned Warbler.

Fairly common summer resident in mountains of the State.

Vermivora ruficapilla ridgwayi van Rossem. Calaveras Warbler.

Uncommon transient.

Vermivora virginiae (Baird). Virginia Warbler.

Common summer resident throughout the State from the oak belt up to mountain aspen groves.

Vermivora luciae (Cooper). Lucy Warbler.

Common summer resident in cottonwoods of Lower Sonoran Zone of southern Utah. Abundant around St. George.

Dendroica aestiva aestiva (Gmelin). Eastern Yellow Warbler.

Infrequent transient. Two records: Marshall and Leatham (Auk, 59, 1942:39) report a specimen taken on June 8, 1937, at Gunnison Island, Great Salt Lake, and Cottam (Wilson Bull., 54, 1942:255) refers to a specimen from Provo taken July 30, 1872, by Henry W. Henshaw.

Dendroica aestiva morcomi Coale. Rocky Mountain Yellow Warbler.

Common summer resident throughout the State breeding in cottonwoods and willows of lowland valleys. Probably the breeding yellow warblers of Utah represent only one race, but there is some difference of opinion as to what to call them. Twomey (Ann. Carnegie Mus., 28, 1942:440) uses the name *D. a. brewsteri*. All records thus far reported for southwestern Utah under *sonorana* are referable to the race *morcomi* (Behle, Bull. Univ. Utah, 33, 1943:64).

Dendroica coronata (Linnaeus). Myrtle Warbler.

Rare transient or accidental in Utah. Cottam (Wilson Bull., 54, 1942:254) reports a specimen taken on October 9, 1870, barely in Utah, in the Uinta Mountains in the extreme northeastern corner of the State.

Dendroica auduboni auduboni (Townsend). Northern Audubon Warbler.

Transient through Utah.

Dendroica auduboni memorabilis Oberholser. Rocky Mountain Audubon Warbler.

Common summer resident in mountains.

Dendroica nigrescens (Townsend). Black-throated Gray Warbler.

Common summer resident in piñon-juniper forest. Twomey (Ann. Carnegie Mus., 28, 1942:444) lists the subspecies *halsei* of Oberholser (Sci. Publ. Cleveland Mus. Nat. Hist., 1, 1930:101) but there is some doubt as to the existence of two geographic races of this species (Behle, Bull. Univ. Utah, 33, 1943:65).

Dendroica townsendi (Townsend). Townsend Warbler.

Uncommon transient.

Dendroica fusca (Müller). Blackburnian Warbler.

Allen (Bull. Mus. Comp. Zool., 3, 1872:166) states this warbler was not common around Ogden, Utah, in September of 1871 but a "few specimens [were] obtained." This record was cited by Ridgway and Henshaw. If valid, the birds occurred accidentally. I have not had occasion to verify the identification.

Dendroica graciae graciae Baird. Grace Warbler.

Uncommon summer resident in mountains of southern Utah. Reported from Zion National Park by Presnall (Proc. Utah Acad. Sci., Arts, Letters, 12, 1935:207).

Seiurus noveboracensis (Gmelin). Water-Thrush.

Uncommon transient. All records thus far have been listed under the subspecies *notabilis*, but it would not be surprising if some of them would be found upon further study to be *linnaeus* (McCabe and Miller, Condor, 35, 1933:196).

Oporornis tolmiei (Townsend). Macgillivray Warbler.

Common summer resident throughout the State in chaparral areas of mountains.

Geothlypis trichas occidentalis Brewster. Western Yellow-throat.

Fairly common summer resident except in southwestern portion of the State. Occurs in cattail and tule marshes and in willow-cottonwood association bordering valley streams.

Geothlypis trichas scirpicola Grinnell. Tule Yellow-throat.

Summer resident around marshes of Virgin River Valley, in southwestern Utah (van Rossem, Condor, 32, 1930:297 and Behle, Bull. Univ. Utah, 33, 1943:66).

Icteria virens auricollis Bonaparte. Long-tailed Chat.

Common summer resident throughout Utah along streams and rivers in valleys.

Wilsonia pusilla pileolata (Pallas). Northern Pileolated Warbler.

Fairly common transient. Probably nesting in high mountains.

Setophaga ruticilla (Linnaeus). American Redstart.

Uncommon summer resident in northern Utah where it seems to occur only in cottonwood-willow association of valleys.

Setophaga picta picta Swainson. Painted Redstart.

One sight record for Zion National Park, April 26, 1930, reported by Presnall (Proc. Utah Acad. Sci., Arts, Letters, 12, 1935:207).

Family PLOCEIDAE. Weaver Finches.

Passer domesticus domesticus (Linnaeus). English Sparrow.

Very common resident. Introduced as early as 1872 (Allen, Bull. Mus. Comp. Zool., 3, 1872:167).

Family ICTERIDAE. Meadowlarks and Blackbirds.

Dolichonyx oryzivorus (Linnaeus). Bobolink.

Fairly common summer resident in fields of northern Utah.

Sturnella neglecta Audubon. Western Meadowlark.

Common summer resident in valleys throughout the State. Winters in small numbers in northern Utah but is common in winter in southern part of the State.

Xanthocephalus xanthocephalus (Bonaparte). Yellow-headed Blackbird.

Common summer resident of marshes and sloughs of northern Utah.

Agelaius phoeniceus fortis Ridgway. Thick-billed Red-wing.

Common summer resident, perhaps permanent resident, in extreme northeastern Utah, in Bear Lake region, but even here it intergrades with *A. p. utahensis*.

Agelaius phoeniceus utahensis Bishop. Utah Red-wing.

Common summer resident, and rare permanent resident, in central northern, central and southern Utah.

Agelaius phoeniceus nevadensis Grinnell. Nevada Red-wing.

Individuals have been reported as occurring in breeding colonies of *utahensis* or *fortis*, although these may be extremes of the other races. Probably breeds in central western and north-western Utah near Nevada border.

Icterus cucullatus nelsoni Ridgway. Arizona Hooded Oriole.

Reported for extreme southwestern Utah by Hardy (Wilson Bull., 53, 1941:125) and Behle (Bull. Univ. Utah, 33, 1943:68).

Icterus parisorum Bonaparte. Scott Oriole.

Summer resident in Joshua tree belt on west slope of Beaver Dam Mountains in southwestern Utah. Also reported as breeding in the piñon-juniper belt of Uinta Basin by Twomey (Ann. Carnegie Mus., 28, 1942:453). One other unusual non-breeding record is for Nephi (Long, Condor, 45, 1943:39).

Icterus bullockii bullockii (Swainson). Bullock Oriole.

Common summer resident in valleys throughout the State.

Euphagus cyanocephalus cyanocephalus (Wagler). Brewer Blackbird.

Common resident in valleys.

Molothrus ater artemisiae Grinnell. Nevada Cowbird.

Fairly common summer resident in lowland valleys throughout the State except in southwestern corner.

Molothrus ater obscurus (Gmelin). Dwarf Cowbird.

Summer resident in extreme southwestern Utah (Behle, Bull. Univ. Utah, 33, 1943:69).

Family THRAUPIDAE. Tanagers.

Piranga ludoviciana (Wilson). Western Tanager.

Common transient in lowlands and summer resident in mountains.

Family FRINGILLIDAE. Grosbeaks, Finches, Sparrows, and Buntings.

Hedymeles melanocephalus melanocephalus (Swainson). Rocky Mountain Black-headed Grosbeak.

Common summer resident from valleys up to mountain chaparral. Only one race appears to be

found in the State but owing to a name mix-up the race has often been listed as *H. m. papago*. *Guiraca caerulea interfusa* Dwight and Griscom. Western Blue Grosbeak.

Summer resident along waterways of Virgin and Santa Clara rivers in southwestern Utah.

Passerina cyanea (Linnaeus). Indigo Bunting.

Casual in summer in Virgin River valley of Washington County, southwestern Utah.

Passerina amoena (Say). Lazuli Bunting.

Summer resident throughout the State. Common in lowland thickets and occasionally found in similar habitats in lower portions of mountains.

Hesperiphona vespertina brooksi Grinnell. Western Evening Grosbeak.

Fairly common winter visitant in valleys of Utah; breeds rarely in mountains. Twomey (Ann. Carnegie Mus., 28, 1942:459) lists three specimens from the Uinta Mountains as of the race

montana although no systematic discussion is included.

Carpodacus cassinii Baird. Cassin Purple Finch.

Fairly common summer resident in mountains.

Carpodacus mexicanus (Say). House Finch.

Common summer resident of valleys, wintering in smaller numbers. According to Moore (Condor, 41, 1939:191) the Utah population is an intergrading one between *solitudinis* and *frontalis*. Probably those from western Utah are closer to *solitudinis*, those from eastern Utah closer to *frontalis*. Twomey (Ann. Carnegie Mus., 28, 1942:460) lists his specimens from the Uinta Basin under the latter name.

Pinicola enucleator montana Ridgway. Rocky Mountain Pine Grosbeak.

Uncommon permanent resident in high mountains.

Leucosticte tephrocotis littoralis Baird. Hepburn Rosy Finch.

Fairly common winter visitant in lowlands.

Leucosticte tephrocotis tephrocotis (Swainson). Gray-crowned Rosy Finch.

Fairly common winter visitant.

Leucosticte atrata Ridgway. Black Rosy Finch.

Fairly common winter visitant in lowlands occurring in flocks with the Hepburn and Gray-crowned rosy finches. Breeds in Uinta Mountains and probably on other mountain ranges of the State.

Acanthis linaria linaria (Linnaeus). Common Redpoll.

Two specimens taken in Utah, October 10, 1870, on north slope of Uinta Mountains in north-eastern Utah (Cottam, Wilson Bull., 54, 1942:254).

Spinus pinus pinus (Wilson). Northern Pine Siskin.

Common summer resident throughout the State from valleys up into coniferous forests of mountains. Winters in smaller numbers.

Spinus tristis pallidus Mearns. Pale Goldfinch.

Common summer resident in valleys.

Spinus psaltria psaltria (Say). Arkansas Goldfinch.

Probably a rare transient. A few sight records pertain to this race. Apparently at least one specimen has been collected. Knowlton (Proc. Utah Acad. Sci., Arts, Letters, 14, 1937:165) reports a specimen taken near Flux, September 22, 1934, and Stanford (Proc. Utah Acad. Sci., 15, 1938:144) mentions a specimen from Dolomite, Tooele County, September 22, 1934. Probably reference is made in each case to the same specimen.

Spinus psaltria hesperophilus (Oberholser). Green-backed Goldfinch.

Common summer resident in valleys, especially frequenting the cottonwoods.

Loxia curvirostra bendirei Ridgway. Bendire Crossbill.

Status uncertain. Possibly breeds in northern and central Utah; casual or vagrant elsewhere. Griscom (Proc. Boston Soc. Nat. Hist., 41, 1937:170) lists one from the Beaver Mountains. Woodbury (Condor, 41, 1939:162) gives several records.

Loxia curvirostra benti Griscom. Bent Crossbill.

Breeds in northeastern Utah in Uinta Mountains. Hayward (Auk, 60, 1943:276) indicates that the population there is not typical. Probably intergradation takes place with both *bendirei* and *grinnelli* (see also Twomey, Ann. Carnegie Mus., 28, 1942:464).

Loxia curvirostra grinnelli Griscom. Grinnell Crossbill.

Status uncertain. Possibly breeds in southwestern Utah and central southern Utah where intergradation with *benti* occurs (Woodbury, Condor, 41, 1939:162).

Loxia curvirostra stricklandi Ridgway. Mexican Crossbill.

Status uncertain. Reported by Woodbury (*op. cit.*) from south-central Utah.

Utah appears to be in a vast intergrading area for the several races of crossbills indicated above and little is known about the geographic variation of the breeding populations of Utah.

- Oberholseria chlorura* (Audubon). Green-tailed Towhee.
Common summer resident in mountains and transient in lowlands. The range of the race *O. c. zapotlia* Oberholser (Sci. Publ. Cleveland Mus. Nat. Hist., 4, 1932:10) would include southwestern Utah. However, van Rossem (Pacific Coast Avifauna No. 24, 1936:55) and Miller (Condor, 43, 1941:259) conclude that this race is invalid.
- Pipilo maculatus arcticus* (Swainson). Arctic Towhee.
Uncommon winter visitant.
- Pipilo maculatus montanus* Swarth. Spurred Towhee.
Common permanent resident in oak thickets and similar habitat of valleys and foothills.
- Pipilo aberti* Baird. Abert Towhee.
Common permanent resident in the Virgin River valley of Washington County, southwestern Utah.
- Calamospiza melanocorys* Stejneger. Lark Bunting.
Uncommon transient.
- Passerculus sandwichensis alaudinus* Bonaparte. Western Savannah Sparrow.
Specimen taken on December 19, 1939, at Santa Clara (Behle, Bull. Univ. Utah, 33, 1943:74).
- Passerculus sandwichensis nevadensis* Grinnell. Nevada Savannah Sparrow.
Fairly common summer resident in wet meadows of lowland valleys and some mountain valleys.
- Ammodramus savannarum bimaculatus* Swainson. Western Grasshopper Sparrow.
Uncommon summer resident in valleys.
- Passerherbulus caudacutus* (Latham). Leconte Sparrow.
Accidental. Cottam (Condor, 43, 1941:116) reports a specimen taken near Provo on December 24, 1927.
- Poocetes gramineus affinis* (G. S. Miller). Oregon Vesper Sparrow.
One record pertaining to a specimen taken in September in the Henry Mountains (Stanford, Bull. Univ. Utah, 21, 1931:10).
- Poocetes gramineus confinis* Baird. Western Vesper Sparrow.
Common summer resident and transient in valleys.
- Chondestes grammacus strigatus* Swainson. Western Lark Sparrow.
Common summer resident in valleys.
- Amphispiza bilineata deserticola* Ridgway. Desert Black-throated Sparrow.
Fairly common summer resident in arid deserts of the State. Common in southwestern Utah.
- Amphispiza belli nevadensis* (Ridgway). Northern Sage Sparrow.
Fairly common summer resident in sage areas of valleys of northern Utah; winters in southern Utah.
- Junco hyemalis hyemalis* (Linnaeus). Slate-colored Junco.
Uncommon winter visitant in lowlands.
- Junco hyemalis cismontanus* Dwight. Cassiar Junco.
Rare transient or winter visitant. Two specimens collected by Behle (Wilson Bull., 53, 1941:184), April 3 and 6, 1938, 19 miles south of Moab in the La Sal Mountain region, southeastern Utah.
- Junco oreganus shufeldti* Coale. Shufeldt Junco.
Rare transient and winter visitant.
- Junco oreganus montanus* Ridgway. Montana Junco.
Abundant winter visitant throughout the State.
- Junco oreganus mearnsi* Ridgway. Pink-sided Junco.
Uncommon winter visitant. An area of hybridization with *J. c. caniceps* occurs in extreme northern Utah.
- Junco caniceps caniceps* (Woodhouse). Gray-headed Junco.
Fairly common summer resident in mountains. Occasionally winters in small numbers in valleys.
- Spizella arborea ochracea* Brewster. Western Tree Sparrow.
Fairly common winter visitant in valleys throughout the State.
- Spizella passerina arizonae* Coues. Western Chipping Sparrow.
Common summer resident from valleys up into mountains.
- Spizella pallida* (Swainson). Clay-colored Sparrow.
One record of a specimen collected at Dolomite, Tooele County, September 21, 1934 (Knowlton, Proc. Utah Acad. Sci., Arts, Letters, 14, 1937:165).
- Spizella breweri breweri* Cassin. Brewer Sparrow.
Common summer resident in sage-brush areas from valleys up into mountains.
- Spizella atrogularis evura* Coues. Black-chinned Sparrow.
Uncommon summer resident reported thus far only from piñon-juniper belt of southwestern

Utah by Behle (Condor, 42, 1940:224) and Hardy and Higgins (Proc. Utah Acad. Sci., Arts, Letters, 17, 1940:110).

Zonotrichia querula (Nuttall). Harris Sparrow.

Uncommon winter visitant in valley thickets. The few records are well distributed over the State.

Zonotrichia leucophrys oriantha Oberholser. Oregon White-crowned Sparrow.

Fairly common summer resident in mountains of northern Utah. Also possibly a rare winter visitant in valleys of northern and central Utah and in southern Utah. Although the race *oriantha* (Oberholser, Sci. Publ. Cleveland Mus. Nat. Hist., 4, 1932:12) is a recognizable race of wide range (Miller, Condor, 43, 1941:262), it will be necessary closely to check all specimens to see if the race *Z. l. leucophrys* may not also be represented among wintering populations in Utah.

Zonotrichia leucophrys gambelii (Nuttall). Gambel Sparrow.

Very common winter visitant in lowlands, especially in southern Utah.

Zonotrichia coronata (Pallas). Golden-crowned Sparrow.

Accidental. One record (Long, Condor, 38, 1936:89) for Zion National Park where an adult was taken on January 16, 1936.

Passerella iliaca schistacea Baird. Slate-colored Fox Sparrow.

Uncommon summer resident in mountains.

Melospiza lincolni lincolni (Audubon). Eastern Lincoln Sparrow.

Uncommon transient.

Melospiza lincolni alticola Miller and McCabe. Montane Lincoln Sparrow.

Uncommon summer resident in mountains; transient through valleys.

Melospiza georgiana (Latham). Swamp Sparrow.

Accidental. One record by Henshaw reported in the various Wheeler Survey reports; based on specimen collected at Washington on October 23, 1872.

Melospiza melodia juddi Bishop. Dakota Song Sparrow.

Rare transient through eastern part of State. Reported by Twomey (Ann. Carnegie Mus., 28, 1942:476).

Melospiza melodia montana Henshaw. Mountain Song Sparrow.

Fairly common summer resident throughout valleys of the State except Virgin River valley of Washington County, southwestern Utah. Winters in small numbers in northern Utah; numerous in winter in southwestern Utah.

Melospiza melodia merrilli Brewster. Merrill Song Sparrow.

Rare transient and winter visitant.

Melospiza melodia fallax (Baird). Virgin River Song Sparrow.

Fairly common summer resident in the Virgin River valley of southwestern Utah.

Plectrophenax nivalis nivalis (Linnaeus). Eastern Snow Bunting.

Uncommon winter visitant to northern Utah (Johnson, Wilson Bull., 47, 1935:160 and 294).

SUMMARY

Based on an evaluation of records in the literature, all kinds of birds occurring in Utah have herein been listed. Several kinds reported have not been accepted, however. Seasonal status, abundance, general area of occurrence and habitat are indicated for most species, and occasional systematic comments are given where warranted.

A total of 350 "kinds," that is, species and subspecies, have been included in the list. Of these, 306 are full species. Six species have been introduced or have spread into the State, making the number of native species 300. Incidentally, of those introduced, 2 have apparently not survived through the years, 3 are well established as permanent residents. The Starling is as yet only a winter visitant.

In analyzing the avifauna of the state on the basis of seasonal occurrence, a few forms have been considered as irregular or casual in occurrence. In both this and the accidental category, more data may indicate the present allocation to be incorrect. Considerable difficulty has been experienced in deciding the status of some birds of regular occurrence. This has arisen not so much from lack of information as from the fact that the status varies from time to time or from place to place in the state. In such instances the birds have been placed in the category most representative of their status

in the writer's experience. Accordingly, it appears that there are 65 species and subspecies permanently resident, of which 59 are full species and 6 are represented by 2 races each. Summer residents total 160 species and subspecies of which 149 are full species. Of the latter, 5 species are represented by 2 geographic races and 3 species by 3 races. Winter visitants number 25 species and subspecies of which 22 are full species. One of these has 2 races and one has 3 races in the state's avifauna. The total number of species and subspecies that are transient is 58 with 57 being full species and one having 2 races. Some 30 birds are accidental, 29 being full species and one having 2 races. Finally, 7 full species have been considered casual.

As a rough indication of the proportions of the whole state's avifauna in each of the seasonal categories, the following figures have been calculated. The basis has been the number of "kinds" of each category. Permanent resident, about 18 per cent; summer resident about 46 per cent; winter visitants, about 7 per cent; transients a little better than 16 per cent; casual or irregular, about 2 per cent; accidental, 9 per cent; and introduced about 2 per cent. These figures are at best only approximate.

Many systematic problems exist with respect to the number of subspecies of some species that are to be found in Utah. The present list, however, brings the recorded information up to date, uses modern systematics, clarifies many ambiguities and points out some of the unsolved problems.

Department of Biology, University of Utah, Salt Lake City, November 25, 1943.

FROM FIELD AND STUDY

Methods of Grasping and Carrying Prey.—The note by Allen (Auk, 56, 1939:476-77) entitled "Left-handedness in the Carolina Paroquet" stimulated the writer to make similar observations on birds in the vicinity of the Malheur National Wildlife Refuge, Oregon. Because of an opportunity to witness the manner in which a number of hawks and owls grasped and carried their prey, I decided to record and tabulate the data to determine whether there was a preference in the manner of holding the victim.

Species	Beak	Right foot	Left foot	Both feet	Remarks
<i>Aquila chrysaetos</i>	....	....	....	1	Carried gadwall (female) short distance.
<i>Circus hudsonius</i>	....	9	6	....	One carried portion of rabbit (carcass) in right foot. Other prey were mice.
<i>Accipiter velox</i>	....	1	....	....	English Sparrow.
<i>Buteo borealis</i>	....	6	5	4	One observed to catch two mice with left foot. One carried bull snake, one a pheasant, one a ground squirrel and one a mouse in both feet. Other prey were mice.
<i>Buteo swainsoni</i>	....	5	8	1	One mouse grasped in both feet after hawk was forced to fly from perch a number of times. One held mouse under left foot when perched and when flying carried it in beak and then grasped in right foot. One had juvenile coot, two a duckling. One duckling grasped in both feet after hawk forced to fly from several perches. One mouse carried in beak a short distance before being grasped by left foot during flight. One carried a duck in both feet.
<i>Buteo lagopus s. johannis</i>	....	....	2	....	Mice taken. One observed caught in the same foot.
<i>Falco sparverius</i>	1	3	4	....	Insects and mice taken chiefly. One had a beetle, two a mouse and one had portion of recently killed blackbird in left foot. One had a grasshopper in its beak.
<i>Bubo virginianus</i>	....	....	....	1	Carrying live garter snake.
<i>Asio flammeus</i>	2	....	....	....	Carrying mouse.
TOTALS	3	24	25	7	

Observations were made during the period from April 6, 1940, to November 2, 1943. The data gathered on these birds show that each foot is used by hawks about the same number of times. This would indicate that if individual birds of prey are either right- or left-footed, the percentage is not decidedly in favor of either foot. However, it should not be inferred that the individuals observed were necessarily predominantly right- or left-footed or that there was no preference in foot use by each individual bird. Information on the latter point would necessitate detailed observations on marked or caged individuals.—CLARENCE A. SOTER, *United States Fish and Wildlife Service, Frenchglen, Oregon, December 16, 1943.*

Aerial Insect Feeding by the California Gull.—For two consecutive years, concentrations of California Gulls (*Larus californicus*) have been noted catching crickets in flight. The first instances were noted between August 15 and August 20, 1942, when several gulls were seen hawking over the Richmond Shipyard at Richmond, Contra Costa County, California, late in the evening. On August 23 about twenty gulls were seen. From their actions it was obvious that they were catching insects in flight but, as they flew fifty to one hundred feet from the ground, the identity of their prey could not be ascertained. On succeeding days the gulls became more numerous, appearing about dusk and remaining until a half hour after dark. On September 9 fully 100 gulls were present and these flew low enough for some to be identified as *Larus californicus*. All appeared to be the same species, though identification was difficult in the darkness. The insects upon which they fed could be seen as black dots, moving swiftly and steadily either horizontally or obliquely. Many came to the bright lights on the ground and were identified as the common black cricket, *Gryllus assimilis*. Seemingly the brilliant lights of the shipyard attracted the crickets while engaged in a nuptial flight from a large surrounding area. The flight, both of gulls and crickets, reached its peak on September 11 when about 400 gulls were seen. The following day dead crickets were abundant where they had been stepped on or run over by vehicles. The cricket swarm had appreciably decreased on September 13; about 50 gulls were seen. For several days following, four to six gulls were seen hawking over the shipyards in the evenings, apparently catching crickets, although no crickets were seen on the ground or in flight.

In early June, 1943, a minor flight of *Gryllus* was noted, unaccompanied by gulls; California Gulls normally are absent from the region in spring.

On September 3, 1943, five gulls were noted hawking over the shipyard in the dusk. As in the previous year, no insects could be seen from the ground. The number of gulls steadily increased, until September 16, when an estimated 400 were present. The weather on the 16th, 17th and 18th was unusually warm. About the same number of gulls was present on these three days. Crickets were seen in abundance, and other insects as well. Moths, crane flies and water beetles were most common. Two large water bugs (Belostomatidae) were also noted. The black crickets, however, outnumbered all other insects and the gulls seemed to be feeding on them exclusively. A marked decrease in the number of gulls was apparent on September 19. Only about twenty were seen on the 21st. Two or three were seen every evening for a week thereafter, but no crickets were seen. The hawking of the gulls consisted of a steady flight at moderate speed, seemingly accomplished by movements principally of the terminal part of the wings. They occasionally swerved to left or right or dipped down to catch an insect, but most captures were made with an upward swoop followed by a return to the original flight level. Their flight continued long after complete darkness had fallen. The insects were doubtless made visible to them by the many brilliant lights of the shipyard. The gulls hunted in absolute silence.—WALTER W. DALQUEST, *Museum of Vertebrate Zoology, Berkeley, California, January 9, 1944.*

Notes on Some Birds Taken in Utah.—While conducting field work at St. George in southern Utah from October 5 to 25, 1937, fifty-three species and subspecies were collected. The following species appear to merit especial attention. One has seldom been reported whereas two are new additions to the State list.

Sialia mexicana occidentalis. Western Bluebird. There are few records of this bluebird from western and central Utah. A single male was taken from a flock of seven *Sialia mexicana bairdi*, the breeding form in Utah, on October 21, 1937, at Kanab, Utah. One male *S. m. occidentalis* was obtained 19 miles south of Moab, Utah (Behle, *Wilson Bull.*, 3, 1941:183).

Vermivora celata lutescens. Lutescent Orange-crowned Warbler. A Lutescent Warbler taken at St. George, Utah, on October 12, 1937, constitutes the first record for the State. The author reported *Vermivora celata celata* as a fall migrant in northeastern Utah and *Vermivora celata orestera* as the breeding form in the mountains of the Uinta Basin (Twomey, *Ann. Carnegie Mus.*, 28, 1942:341-490).

Anthus rubescens pacificus. Western Pipit. A male of this species was collected from a flock of twenty *Anthus rubescens alicola*, fifteen miles southeast of St. George, Utah, on October 19, 1937. This straggler is the first record of the Western Pipit for Utah.

Zonotrichia leucophrys oriantha. Oregon White-crowned Sparrow. Seventeen specimens from the Uinta Basin, Utah (Jensen; Paradise Park, Uinta Mountains; Bald Mountains; Heber), were identified as *Zonotrichia leucophrys leucophrys* (Twomey, *loc. cit.*). Since collecting a series of topotypical specimens of *Zonotrichia l. oriantha* from Barley Camp in the Warner Mountains, fourteen miles southwest of Adel, Oregon, the birds from the Uinta Basin have been found to be *Z. l. oriantha*. A comparison of measurements with breeding specimens of the eastern race failed to show any significant differences.

The Uinta specimens are identical with topotypical specimens of *oriantha* in being much paler (more grayish tan) over the dorsal surface, particularly the rump, back and nape, than the eastern race, *leucophrys*. This paleness is also pronounced over the breast and flanks. The rump of the Uinta birds has an olive shade that distinguishes them slightly from *oriantha* and *leucophrys*. The Uinta specimens must, therefore, be regarded as belonging to the western race, *Z. l. oriantha*. Miller (Condor, 43, 1941:262) in a recent study of this group makes the following statements about this race: "There seem to be good grounds for recognizing the race [*Z. l. oriantha*] if all eastern materials is as dark-colored as the specimens we have at hand. Close comparison of groups of breeding birds from the Cascades, Sierra Nevada, and Wallowa Mountains, Oregon, and Rocky Mountains of Wyoming and Utah, shows no differences between western populations."—ARTHUR C. TWOMEY, *Carnegie Museum, Pittsburgh, Pennsylvania, December 14, 1943.*

California Cuckoo Collected in Eastern Oregon.—In the "Birds of Oregon" (Gabrielson and Jewett, 1940:329-330), the California Cuckoo (*Coccyzus americanus occidentalis*) is reported as uncommon in eastern Oregon, only three records being available at the time this book was published. Bendire first recorded cuckoos in 1876 as nesting along the Snake River, on the Oregon side. Since then cuckoos were recorded in 1896 and 1910 in southeastern Oregon.

On November 28, 1943, an adult California Cuckoo obligingly died in the writer's yard in La Grande, Oregon. The cuckoo was prepared as a museum specimen for the Eastern Oregon College collection.

The writer's record of an American Redstart family at La Grande (Condor, 44, 1942:282) was again verified this past summer, as redstarts were back at the Riverside Park again. Such records as these and the recent one of Catbirds nesting at the Malheur Refuge (Sooter, Condor, 45, 1943:234) indicate further possibilities for discovery of birds supposedly rare in this little known section of Oregon.—CHARLES W. QUAINANCE, *Eastern Oregon College, La Grande, Oregon, December 1, 1943.*

A Coastal Record of the Emperor Goose in California.—My attention was recently drawn to the presence of a specimen of an Emperor Goose (*Philacte canagica*) in the collection of the California Academy of Sciences (no. 43715, sex unknown), taken December 13, 1928, on Limantour Bay, Marin County, California, by Mr. Francis Coit. Although members of this species winter principally in the Aleutian Island area, a few individuals come as far south as central California where they usually occur in fresh-water situations. Heretofore the most southern known locality of occurrence for the Emperor Goose on salt water along the Pacific coast of North America has been Humboldt Bay, California, where it was recorded by Charles H. Townsend (Auk, 3, 1886:491) in the winter of 1884.—ROBERT T. ORR, *California Academy of Sciences, San Francisco, California, December 21, 1943.*

Observations of California Pine Grosbeak at Southern Limit of Range.—On July 25, 1942, Dixon (Condor, 44, 1942:280) observed the California Pine Grosbeak (*Pinicola enucleator californica*) "at a point $\frac{1}{4}$ mile above the junction of Evolution Creek with the South Fork of the San Joaquin River at an elevation of about 8900 feet, in Fresno County, California." In a later publication (Condor, 45, 1943:217) he states that this locality is the southernmost known record station for this grosbeak. Since records of the California Pine Grosbeak in the southern Sierra Nevada are rare, it may be of interest to give two additional locality records for it in Fresno County.

On September 3, 1939, I observed three individuals, two males and a female, at "Little Doris Lake," at an altitude of about 10,000 feet. This lakelet is shown, although not named, on the U.S.G.S. Kaiser Quadrangle (reprint of 1939) in the SE $\frac{1}{4}$ of sec. 19, Twp. 9 S., R. 27 E., M.D.M. The birds were seen for only a few minutes, but at such close range that identification was positive. Almost two years later, on July 7, 1941, a male and a female were seen at Dinkey Lake (sec. 7, Twp. 9 S., R. 27 E., M.D.M.) at an elevation of about 9200 feet. These birds were quite tame, and remained close to our camp for several hours. The male was in full red plumage, as were those seen in 1939.

Both "Little Doris" and Dinkey Lake are about 15 miles (air line) west and a little south of Dixon's locality.—WILLIAM A. DILL, *California Division of Fish and Game, Fresno, California, January 25, 1944.*

Shower-bathing in the Rain.—On December 20, 1943, while looking out the window enjoying one of our first showers after the long drought of summer and autumn, my attention was drawn to the odd movements of a Mockingbird (*Mimus polyglottos*). The hour was noon and the air temperature 48° F. The bird was excited by the influence of the shower. Presently it flew up into a small denuded soft maple tree. Here it grasped the larger twigs firmly and crouching down, spread its wing and tail feathers horizontally in apparent enjoyment of the falling rain drops. The feathers of the head, neck and body did not seem to be involved in the process; but the wing and tail feathers were in almost constant motion. First the wing and then the tail would fan out, alternating, in rapid horizontal flutterings; the motions continuing for a full five minutes. Although previously we had had a few showers in the night, this was our first daytime shower of any consequence for some months; it appeared to stimulate the bird, and the raindrops of medium-to-large size, falling vertically, and gently, without driving influence of wind, seemed unusually suited to the bird's needs and probably called up experiences of other first winter rains in the desert. Suddenly, with but slight indication of its intent, the mocker darted away into the evergreen foliage of a near-by camphor tree (*Cinnamomum camphora*) and was lost to view.—WILLIAM T. SHAW, *Fresno, California, December 30, 1943.*

A Correction of Identification of Sandpipers.—Three specimens collected and identified by A. C. Lloyd as *Ereunetes pusillus* and deposited in the Royal Ontario Museum, Toronto, Canada, were reported by me from the Uinta Basin, Utah (Ann. Carnegie Mus., 28, 1942:394). Recently these birds were identified by Mr. L. L. Snyder as *Ereunetes mauri*.—ARTHUR C. TWOMEY, *Carnegie Museum, Pittsburgh, Pennsylvania, September 1, 1943.*

NOTES AND NEWS

A meeting of the Cooper Ornithological Club will be held at the Los Angeles County Museum, Exposition Park, Los Angeles, California, on Thursday, April 6, 1944, at 7:30 p.m., to transact necessary business.

Notice of this meeting and unsigned proxies will be sent to all members, and it is *very important* that proxies be signed and returned promptly.—GEORGE WILLETT, *Secretary, Board of Directors*.

In this issue of *The Condor* appear two features made possible through special contribution to the cost of publication. The color plate of *Neochloe* was provided for by Milton S. Ray, and a substantial part of the cost of the "Checklist of the Birds of Utah" was supplied by the University of Utah Research Committee. Through these generousities all members of the Club have benefitted, and the editors take pleasure in expressing the appreciation of the entire organization.—A.H.M.

The serious student of bird behavior will find useful a paper by N. E. Collias entitled "Aggressive Behavior Among Vertebrate Animals," published in the January, 1944, issue of *Physiological Zoology* (pp. 83-123). This paper represents a well organized review of selected literature on aggressive behavior as seen in the individual, the social group, the population, and the animal community, and exemplifies the point of view of Professor W. C. Allee and his students at the University of Chicago. For ornithologists it should serve to emphasize the fundamentally aggressive nature of bird behavior. A shortcoming of this, and frequently other, "synthesizing" articles is the scattered and limited nature of the evidence upon which the superstructure of ideas, at times top-heavy, must be built. We refer specifically to evidence from birds in nature. Thus, considerable emphasis is placed by Collias on Scott's studies of social mating groups in the Sage Grouse (*Auk*, 59, 1943:477-498). Scott apparently did not mark his birds. Observations begun before the war by the late James Moffitt and based on birds marked with paint led him to question the relatively extreme degree of dominance attributed to one "master cock" by Scott.—F.A.P.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

OCTOBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, October 28, 1943, with L. W. Taylor in the chair and about 20 members and guests present. Minutes of the Northern Division for September were read and

approved. Minutes of the Southern Division for October were read. Names proposed for membership in the Club were: Earl L. Ninnis, 126 Romie Lane, Salinas, California, by Jean M. Linsdale, and Alexander F. Skutch, Ouzarra de Perez Zeldon, Costa Rica, by Frank A. Pitelka.

Mrs. Kelly opened field reports with the announcement of the expected Red-backed Sandpipers at Alameda during mid-October, one having been seen as early as October 2. A late record for the Western Flycatcher was October 23 in Dimond Canyon. No small menace to victory gardens in Alameda was the influx of Gambel White-crowned Sparrows, 50 of which were roosting in Mrs. Kelly's yard. Dr. Haley remarked that farmers could not agree on the desirability of the existence of horned larks, which habitually eat the cotyledons from young bean sprouts.

As speaker of the evening, Mr. Alden H. Miller presented a paper entitled "Social Parasites Among Birds," in which he discussed the breeding habits of such species as the cowbirds of North and South America and the European cuckoo.

Adjourned.—FRANCES CARTER, *Recording Secretary*.

NOVEMBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, November 18, 1943, with Vice-president L. W. Taylor presiding and 20 members and guests present. Minutes of the Northern Division for October were read and corrected.

The Chairman gave a brief summary of the meeting of the American Ornithologists' Union.

Alden H. Miller reviewed a recent item in the *Transactions of the Linnean Society of New York: Studies in the Life History of the Song Sparrow II; Behavior of the Song Sparrow* and other Passerines, by Margaret Morse Nice. It will be remembered that the first paper in this study appeared in 1937.

Field reports were opened by Lt. Kenneth Stager, who reviewed the reports on the birds of Camp Roberts which he had recently presented before the Southern Division. Of outstanding interest were the presence of the Phainopepla as a winter resident, and the numbers of Yellow-billed Magpies which had taken advantage of the sanctuary provided by the Military Reservation. Mr. Covell presented a list of species observed at Yosemite Valley in the first week in July, including Pygmy Owl, Sierra Grouse, Solitaires, and a Wood Duck with young.

The speaker of the evening was Vincent Mowbray, of the Employment Office of the Mare Island Navy Yard, California, who chose as his

subject, "Wartime Construction versus Birds." Living in one of the new housing projects, Mr. Mowbray has been able to compare the bird life in his neighborhood, in a hilly region, with that of similar adjacent hills which have remained undisturbed.

Adjourned.—FRANCES CARTER, *Recording Secretary*.

DECEMBER.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, December 16, 1943, at 8:00 p.m. in Room 2503, Life Sciences Building, University of California, Berkeley, with President Robert C. Miller in the chair and thirty members and guests present. Minutes for the Northern Division for November were approved as read. There were two proposals for regular membership in the club: Mr. Lancelot Eric Richdale, 23 Skibo Street, Kew, Dunedin, New Zealand, by Alden H. Miller; and Mr. Ben W. Stillwell, P. O. Box 50, Carmel, California, by Kenneth E. Stager.

The President appointed a nominating committee consisting of Mrs. Sheldon, Dr. Benson, and Mr. Dixon to present nominations for officers of the club for the coming year.

The question of the advisability of introducing the wild turkey into California was discussed at some length. Mr. Gordon True of the State Division of Fish and Game said that the Division was not sold on the idea of attempting to introduce wild turkeys into the state, particularly as unsuccessful attempts had been made in the past. Mr. A. Starker Leopold said that to date no one had been able to maintain a breeding stock of pure-bred wild birds.

President Miller then introduced the speaker of the evening, Mr. A. Starker Leopold of the Missouri Conservation Commission, who spoke on his studies of the wild turkey in Missouri. Comparative studies of the breeding habits of wild birds and of the hybrid (wild x domesticated) birds which have been used for restocking were made in an attempt to determine why restocking was unsuccessful. Mr. Leopold concluded his interesting paper with remarks on the inadvisability of attempting to introduce the wild turkey into California.

Adjourned.—ROBERT W. STORER, *Acting Secretary*.

SOUTHERN DIVISION

NOVEMBER.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held Tuesday, November 30, 1943, at 8:00 p.m. in Room 145, Allan Hancock Foundation, Los Angeles, Calif., with President I. D. Nokes in the chair.

Application for membership was read from Lee R. Dice, Laboratory of Vertebrate Biology,

University of Michigan, Ann Arbor, Mich., proposed by John McB. Robertson.

A report of a number of species of birds being eaten by a pair of Duck Hawks regularly roosting in the same city location was made by H. L. Cogswell. Members present indicated they favored protection of these birds in spite of their depredations. A. J. van Rossem noted that he once saw a kingfisher in Arizona dive and catch a lizard on the desert and asked if others had noted the eating of similar food by the species. Mrs. Mary V. Hood reported they had been seen catching grasshoppers in the Arroyo Seco near Los Angeles.

Mr. and Mrs. W. A. Kent had observed on November 29, 1943, a fight between a Prairie Falcon, which evidently possessed a certain field for feeding, and an intruding Red-tailed Hawk. As the former would swoop at the latter, the larger bird would put out its talons for protection. H. L. Cogswell reported having seen a similar clash in which the Red-tailed Hawk flew into an oak tree where the Prairie Falcon would not go. Other remarks were made by S. B. Peyton and Loye Miller.

The lecture of the evening was given by A. J. van Rossem on the subject, "Mexican Birds that Cross or Approach the United States Boundary," illustrated by a large number of skins. He pointed out that since the '80's there has been an apparent movement northward of many species whose common distribution was in Sonora, such as the Black Vulture, Cooper-tailed Trogon, Sulphur-bellied Flycatcher, Scarlet-headed Oriole, and others.

Adjourned.—WALTER W. BENNETT, *Secretary*.

DECEMBER.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held Tuesday, December 28, 1943, at 8:00 p.m. in Room 145, Allan Hancock Foundation, University Avenue and 36th Place, Los Angeles, with President I. D. Nokes presiding.

The application for membership of Robert Lewis Quinsey, 932½ Via Wanda 48, Long Beach 5, California, was read as proposed by Dr. Sarah Atsatt.

President Nokes appointed a nominating committee consisting of Loye Miller, chairman, Hildegard Howard, and Howard Robertson.

Sidney D. Platford reported that Pintails, probably starting a northward migration, were plentiful enough to cause complaints of crop damage. The principal address of the evening was by Dr. Sarah Atsatt, on the subject of "Nature Trails in South Africa," illustrated in Kodachrome which she had taken.

Adjourned.—WALTER W. BENNETT, *Secretary*.



For Sale, Exchange and Want Column.—Each Cooper Club member is entitled to one advertising notice in any issue of *The Condor* free. Notices of over ten lines will be charged for at the rate of 15 cents per line. For this department, address JOHN MCB. ROBERTSON, Buena Park, California.

FOR SALE AT A GREAT SACRIFICE—"Illustrations of the Nests and Eggs of the Birds of Ohio with text"; illustrations by Mrs. N. E. Jones, text by H. Jones; 2 vols. folio, 1879-86. This work is one of the rarest of American ornithologica; only 90 copies were issued, and it has been favorably compared to Audubon's works. Have a set of this rare book and will be glad to quote prices to interested parties.—MRS. L. H. MEARN, *Seven Oaks Hotel, Monrovia, California*.

WANTED—"Journal of Mammalogy," volume 3, 1922. I am anxious to obtain this volume in order to complete my file, and will gladly pay any reasonable price.—LT. KENNETH E. STAGER, *3104 Highland Ave., National City, California*.

FOR SALE—A few copies of "Outdoor Heritage," by H. C. Bryant, at \$1.60, prepaid. This book is essential to every California nature lover.—F. M. DILLE, *Nogales, Arizona*.

FOR SALE—Fifty years accumulation, from leaflets to books, in all branches of biology. Reports, proceedings, etc., U. S. Biological Survey, Smithsonian, National Museum and other museums, states, societies, etc.; exploration, travel, and big game hunting in many lands. State what branch you are interested in and send for price list.—J. A. LORING, *Box 182, Owego, New York*.

FOR SALE—Bent's "Life Histories of North American Birds": nos. 176, 179, \$2.00 each; Bendire's "Life Histories of North American Birds": vol. 1 (paper edition, worn), \$3.50; "American Pheasant Breeding and Shooting" by Quarles, 75¢; "Birds and Mammals of the Western Slope of the Azuero Peninsula, Panama" by Aldrich and Bole, \$1.00; North American Faunas: nos. 21, 22 (without covers), 30, 34, 35, 36, 47, 57, the lot, \$6.00; "Mammals of the Mexican Boundary" by Mearns, \$1.50; "Catalogue of Type Specimens of Mammals—1909" by Lyon and Osgood, 75¢; "Catalogue of Type Specimens—1942" by Poole and Schantz, \$1.00; "Catalogue of Noctuidae in Collection of British Museum" by Hampson, \$2.00; "Entomological News," 67 odd numbers from vols. 16 to 45, the lot, \$6.00.—LAURENCE M. HUEY, *Natural History Museum, Balboa Park, San Diego 1, California*.

FOR SALE—M. M. Nice's *Studies in the Life History of the Song Sparrow II. Behavior of the Song Sparrow and other Passerines*; 328 pp., numerous figures and charts. Price, \$2.75. Special price of \$2.00 if ordered directly from: THE LINNEAN SOCIETY OF NEW YORK, *Central Park West at 79th Street, New York 24, N. Y.*

NOTICE OF ANNUAL MEETING OF MEMBERS OF COOPER ORNITHOLOGICAL CLUB

Notice is hereby given that the annual meeting of the members of the Cooper Ornithological Club, a corporation, will be held at the Los Angeles County Museum of History, Science and Art, Exposition Park, Los Angeles, California, on Thursday, April 6, 1944, at the hour of 7:30 p.m. to elect directors and to consider and act upon the adoption of a resolution authorizing and instructing the Board of Directors of said Club to transfer, assign and convey to the University of California at Los Angeles, without receiving any compensation therefor, all books, magazines, pamphlets, and other publications comprising the Library of the Cooper Ornithological Club, excepting therefrom all files of *The Condor*, the Pacific Coast Avifauna and all other publications of said Club, in consideration of said University providing adequate quarters for the housing and use thereof, the access thereto by accredited members of the Club and accessible storage facilities for back numbers of *The Condor*, Pacific Coast Avifauna and other publications retained by said Club. Also to consider such other business as may come before the meeting. The usual annual program will be omitted.

Dated: February 11, 1944.

GEORGE WILLETT, *Secretary*.

A surplus of Cooper Club Publications offered at very low prices. These all belong in your library. Post paid anywhere.

THE CONDOR

Vols. 14 to 24, inclusive; Vols. 26, 28, 30, 31; and Vols. 34 to 42, inclusive, at \$1.25 per volume (slightly mailed).

PACIFIC COAST AVIFAUNA

No. 1, 1900 Birds of the Kotzebue Sound Region, Alaska; 80 pp., 1 map - - - - - \$.50

By J. GRINNELL

No. 7, 1912 Birds of the Pacific Slope of Southern California; 122 pp. - - - - - \$.50

By G. WILLETT

No. 8, 1912 A Systematic List of the Birds of California; 23 pp. - - - - - \$.25

By J. GRINNELL

No. 9, 1913 The Birds of the Fresno District; 114 pp. - - - - - \$.50

By J. G. TYLER

No. 10, 1914 Distributional List of the Birds of Arizona; 133 pp., 1 map - - - - - \$.50

By H. S. SWARTH

Supplement to Pacific Coast Avifauna No. 10. The author, Anders H. Anderson, has brought this state list up to date. Reprint from The Condor, 36, March, 1934, pp. 78-83 - - - - - \$.20

No. 11, 1915 A Distributional List of the Birds of California; 217 pp., 3 maps - - - - - \$1.00

By J. GRINNELL

No. 12, 1916 Birds of the Southern California Coastal Islands; 127 pp., 1 map - - - - - \$.50

By A. B. HOWELL

No. 13, 1919 Second Ten Year Index to The Condor, volumes XI-XX (1909-1918); 92 pp. - - - - - \$1.00

By J. R. FARMINGTON

No. 14, 1921 The Birds of Montana; 194 pp., 35 illustrations - - - - - \$2.00

By ARETAS A. SAUNDERS

No. 15, 1923 Birds Recorded from the Santa Rita Mountains in Southern Arizona; 60 pp., 4 illustrations. \$.50

By FLORENCE MERRIAM BAILEY

No. 16, 1924 Bibliography of California Ornithology; 2nd Installment; 191 pp. - - - - - \$2.00

By J. GRINNELL

No. 17, 1925 A Distributional List of the Birds of British Columbia; 158 pp., colored frontispiece and map, 26 line maps, 12 pls. - - - - - \$1.50

By ALLAN BROOKS and HARRY S. SWARTH

No. 18, 1927 Directory to the Bird-life of the San Francisco Bay Region; 160 pp., one map, colored frontispiece - - - - - \$1.50

By JOSEPH GRINNELL and MARGARET W. WYTHE

No. 19, 1929 Birds of the Portland Area, Oregon; 54 pp., 21 illustrations - - - - - \$.50

By STANLEY G. JEWETT and IRA N. GABRIELSON

No. 20, 1931 Third Ten Year Index to The Condor, volumes XXI-XXX (1919-1928); 152 pp. - - - - - \$2.00

By G. WILLETT

No. 21, 1933 Revised List of the Birds of Southwestern California; 204 pp. - - - - - \$2.00

By G. WILLETT

No. 22, 1934 Birds of Nunivak Island, Alaska; 64 pp. - - - - - \$1.00

By H. S. SWARTH

No. 23, 1936 The Birds of Nevada; 145 pp. - - - - - \$2.00

By JEAN M. LINSDALE

No. 24, 1936 The Birds of the Charleston Mountains, Nevada; 65 pp., 13 illustrations - - - - - \$1.00

By A. J. VAN ROSSEM

No. 25, 1937 The Natural History of Magpies; 234 pp., colored frontispiece - - - - - unbound, \$2.50 bound, \$3.00

By JEAN M. LINSDALE

No. 26, 1939 Bibliography of California Ornithology; 3rd Installment; 235 pp. - - - - - \$2.00

By J. GRINNELL

MISCELLANEOUS PUBLICATIONS

Biographies

H. W. Henshaw: 56 pp., 3 pls. (from CONDOR, 1919-1920) - - - - - \$.50

Robert Ridgway: 118 pp., 50 pls., with a complete bibliography of his writings (from Condor, 1928) - - - - - \$.50

Bird Art Catalogues

Catalogue of an exhibition of paintings by American Bird Artists, First Annual Meeting, Los Angeles Museum, April, 1926; 24 pp. - - - - - \$.50

Catalogue of the work of Major Allan Brooks shown in connection with the third annual meeting of the Cooper Ornithological Club May 4-6, 1928, under the auspices of the San Diego Society of Natural History, Fine Arts Gallery, Balboa Park, San Diego, Calif.; 10 pp. - - - - - \$.25

Catalogue of an exhibition of bird paintings by Lynn Bogue Hunt, sponsored by the Southern Division of the Cooper Ornithological Club at the Los Angeles Museum, April, 1929; 16 pp., portrait of Lynn Bogue Hunt, and 7 half-tones - - - - - \$.25

An exhibition of scientific drawings by John Livzey Ridgway, shown by the Los Angeles Museum, on the occasion of the Fifth Annual Meeting of the Cooper Ornithological Club - - - - - \$.25

Catalogue of an exhibition of original water colors by Major Allan Brooks, shown under the auspices of the Cooper Ornithological Club, Los Angeles Museum, April, 1936 (Eleventh Annual Meeting of the C. O. C.); 15 pp. and 9 half-tones, including one of Major Brooks - - - - - \$.25

Other Publications

The Story of the Farallones, 1897; 64 pp., 28 pls. \$.10

By C. BARLOW

Report of the Birds of Santa Barbara Islands. Pub. No. 1, Pasadena Acad. Sci., August, 1897; 26 pp. - - - - - \$1.00

By J. GRINNELL

Birds of the Pacific Slope of Los Angeles County. Pub. No. 2, Pasadena Acad. Sci., March, 1898; 52 pp. \$.25

By J. GRINNELL

FOR SALE BY

W. LEE CHAMBERS, Business Manager

Robinson Road

Topanga, California

